millierdickinsonblais

Economic Development Alliance of Southeast Alberta

Investment Attraction Strategy: Solar Energy

December 5, 2011

Contents

1 Introduction

This report has been prepared by Millier Dickinson Blais to provide the Economic Development Alliance of Southeast Alberta with an understanding of the emerging economic opportunities in the solar energy sector, and the competitive positioning of the southeast Alberta region within the sector. The strategy developed includes a wide-range of components:

- A high level overview of global and national trends in renewable energy and solar energy
- An assessment of the factors that influence investment and their relative importance to marketing messages
- An assessment of the sector's value chain
- An investment attraction and marketing strategy for the EDA moving forward
- An implementation plan for the EDA

Summarized below is the strategy that envisions the Southeast Alberta EDA becoming a hub of the development of the solar energy sector in southeast Alberta. The strategy focuses on the short, medium and long term vision for the sector and the actions the EDA can take to ensure that these visions become a reality.

1.1.1 Overview of the Solar Sector

The strategy begins with a broad overview of the current global, national and provincial trends in the solar sector. Generally, the development of the solar energy industry has accelerated in recent years, with investments being made by both public and private entities across the globe. Investments in solar energy are extremely varied by geographic region and are largely fuelled by public programs, such as the feed-in tariff programs throughout Europe and in Ontario.

In Canada, solar energy captured 13% of investment in renewable energy from 2005 to 2010, with much of this investment being fuelled by key incentive programs at the federal and provincial levels. Provincial incentive programs change significantly from province to province, with the Province of Alberta having few policies in regards to the solar industry. Case studies are explored in this section from a variety of jurisdictions in Canada and the US that highlight the development of local renewable energy strategies with and without the support of upper-levels government. These case studies provide the EDA with some best practice examples of the local development of the solar energy sector.

1.1.2 Regional Assets and Opportunities

Sections 3 and 4 of the strategy discuss the assets of southeast Alberta, with section 5 of the report building upon these assets to develop a clear value proposition for the region. In considering this value proposition, it is important to understand what factors are critical for supporting investment and location decisions in the target sector. The

value proposition put forward in the strategy for southeast Alberta emphasizes the following factors:

- **Labour force**: overall the labour force in southeast Alberta is well suited to assist in the growth of the solar sector, with more than 23% of its total current workforce employed in occupations related to or supportive of solar sector development.
- **Local industry**: southeast Alberta has a growing base of existing companies in the solar sector demonstrating high levels of entrepreneurial energy and innovation. An emerging cluster of businesses and researchers is quickly developing, seeking to link existing strengths in oil and gas to solar PV systems that create more efficient and low cost oil and gas systems.
- **Education and training**: the sector-related education, training and research programs available within southeast Alberta form a key element of the region`s value proposition. Medicine Hat College has a wide variety of programming related to workforce skills and aptitudes needed in the solar industry.
- **Resource availability:** southeast Alberta falls within the region of Canada with the highest potential for PV energy generation. Wild Horse, Alberta in the southeast Alberta region (1,373 kWh/kW) falls below only Regway, Saskatchewan (1,384 kWh/kW) for yearly PV potential.

Building on the value proposition, the strategy utilizes a value chain analysis that assesses the backward and forward linkages within the industry's supply chain, highlighting the broader network of industry, institutional, and community supports that are available to encourage the development of the solar energy sector. In understanding the assets of southeast Alberta and their interconnections throughout the value chain, a clear picture of southeast Alberta's competitive advantage is defined.

In order to take advantage of the EDA's competitive positioning in the sector, in Section 5.3 the report proposes specific strategic directions for the EDA. This strategy consists of three components:

- ***Strategic Industry Development Phase 1: Build on Existing Assets/Strategies***
  - By continuing to invest in local utility infrastructure, programming and pilot projects, southeast Alberta can create a welcoming climate for future development. This phase seeks to highlight and build upon the work already being conducted by the EDA, the City of Medicine Hat Utility and key local businesses in developing a solar industry. This includes further development of pilot projects, investment in smart grid technology and establishing local support mechanisms.
- ***Strategic Industry Development Phase 2: Cluster Promotion and Marketing***
  - When sufficient time and energy have been devoted to creating a supportive climate for the solar industry, investment attraction and marketing will be crucial to the development of a solar industry cluster. At this point in the strategy it is important that southeast Alberta successfully brand the region as

a leader of innovative solar energy development. The EDA must cement the role of southeast Alberta as a demonstration site and hub for new projects, while giving local solar entrepreneurs a competitive advantage for growth and expansion outside of the community. In this phase the EDA should actively market and promote the assets and successes developed during phase one of this strategy to potential investors.

- ***Strategic Industry Development Phase 3: Hub Creation***
  - Once the local industry has matured, the longer term vision for the area is to become a hub of the solar energy industry for the Province of Alberta. To begin to fully take advantage of this position the EDA should look to forge partnerships throughout the province to bolster solar research and innovation throughout the area. A "hub and spoke" model of economic development is recommended, as the region uses this framework to begin to develop a clearer understanding of the future position of southeast Alberta in the solar industry.

1.1.3 Investment Attraction Strategy

In section 6, the report describes a comprehensive investment attraction strategy that the Southeast Alberta EDA can utilize to grow the solar sector. Recommended marketing and investment attraction activities build upon three key pillars:

- **Linking local assets in the target area to support marketing efforts** – existing assets in the solar energy sector in southeast Alberta must be inventoried, and key players gathered in advisory structures that direct and support efforts on an ongoing basis
- **Building and communicating specialized knowledge of the segment** – southeast Alberta must develop specialized marketing materials speaking to needs and opportunities within the solar sector, and make these available through dedicated (possibly standalone) aspects of its web presence, with summary materials in print form for supporting direct contact in the market
- **Relationship building within the segment** – to underline the direct interest and connection to the solar industry, southeast Alberta must develop direct links and contacts to the industry in its own space and an its own events, and maintain that contact over time

In order to successfully engage and attract investors and investment from the solar sector, the EDA will need to dedicate a portion of its existing staff resources to develop and deliver marketing efforts over time. While this initial commitment can be small it will likely grow as the sector expands.

In addition to allocating staff time to solar sector development a number of other initiates should be taken to support and develop the sector, these include:

- Establishment of a Solar Sector Investment Attraction Website with Supporting Social Media
- Development of Print Support Materials
- Creation of a Solar Sector Industrial Development Team

- Participation in Solar Industry Conferences and Trade Shows
- External Corporate Calling based on Lead Generation

The Economic Development Alliance of Southeast Alberta has an opportunity to be the structure that links disparate interests together in the region to better coordinate the development of the solar sector. The strategy proposes that through the structure of a *Southeast Alberta Solar Sector Industrial Development Team*, the EDA would spearhead the creation of a specialized structure that unites all of the interested players and parties under a single umbrella. However, rather than acting as the "leader" of this structure, the EDA should position itself as a facilitator, acting as a staff or secretariat to support and implement plans and projects of the larger structure.

1.1.4 Implementation Plan

Section 7 of the strategy builds a comprehensive implementation plan for the EDA, with the over-arching goal of becoming a centre of activity in the solar energy sector. This section builds on the strategic directions of previous sections, and proposes an implementation plan for the EDA and community partners to build the profile and investment readiness of the region in order to accommodate increased investment in solar energy. The implementation strategy is divided into three broad themes:

- **Developing Administrative Capacity**: Build and reorganize the internal and governance structures necessary to effectively manage the development and promotion of the solar energy sector in southeast Alberta.
    - Co-ordination of southeast Alberta's efforts to attract investment in the solar sector is a key to the successful implementation of this strategy, and will rely on the combined efforts of the economic development community in the region, as well other key stakeholders in the solar sector. By creating an industry-based body and supporting it through the work of exiting economic development staff, it will be possible to both enhance the external perception of industry support and involvement while providing dedicated strategic resources to the growth of the sector.
- **Promoting Solar Energy Opportunities**: Undertake detailed internally - and externally-focused marketing and communications activities to establish the region as a centre for solar energy development in Alberta and Canada.
    - Successful attraction of investment in the solar energy sector will require a range of marketing approaches, material and messages to be developed in support of the Southeast Alberta Solar Sector Industrial Development Team's efforts. These marketing approaches will be both formal and informal, and will roll out in different ways at different stages of the implementation process.
- **Becoming Investment Ready**: Create and undertake economic development activities and programs that minimize the barriers to solar energy investment, while offering a compelling argument towards making solar energy investments in southeast Alberta.

- With the potential success of the strategy over the longer term, the southeast Alberta region has the potential to become the centre for solar energy development in Alberta, and perhaps a major centre across all of Canada. Beyond building industry and institutional capacity, the southeast Alberta region much position itself as that hub for the province – becoming a type of clearing house for expertise and technology developed across the province and country, but also from strategic partners across the globe. In order to become a hub, the southeast Alberta area should focus on building up regional strengths in the industry, but also connecting with strategic partners across Canada and the world.

Specific examples of actions and key performance indicators are provided throughout the implementation plan.

2 Solar Industry Trend Analysis

The solar energy industry is divided into two areas: solar photovoltaic (PV) technology, which uses silicon in solar cells to generate electricity from the sun, and solar thermal technology, which uses solar energy to heat water and air. The latter is generally applied at a smaller scale than solar PV. The supply chain, investment, and business opportunities associated with solar energy are extensive, and include the following segments:

- Product manufacturers
- Sales and wholesalers
- Research and consulting
- Engineering design, analysis, and services
- Systems installers

Each of these areas of the value chain represents a potential investment attraction target for the southeast Alberta area and the Economic Development Alliance (EDA). However, the competitive positioning and prospects for the area in the solar energy value chain will be shaped by the industry composition and trends at the global, national, and regional levels. The following section outlines the high-level trends that provide the necessary background to assessing the prospects and opportunities in solar energy for the EDA and southeast Alberta area.

2.1 Global Trends and Context

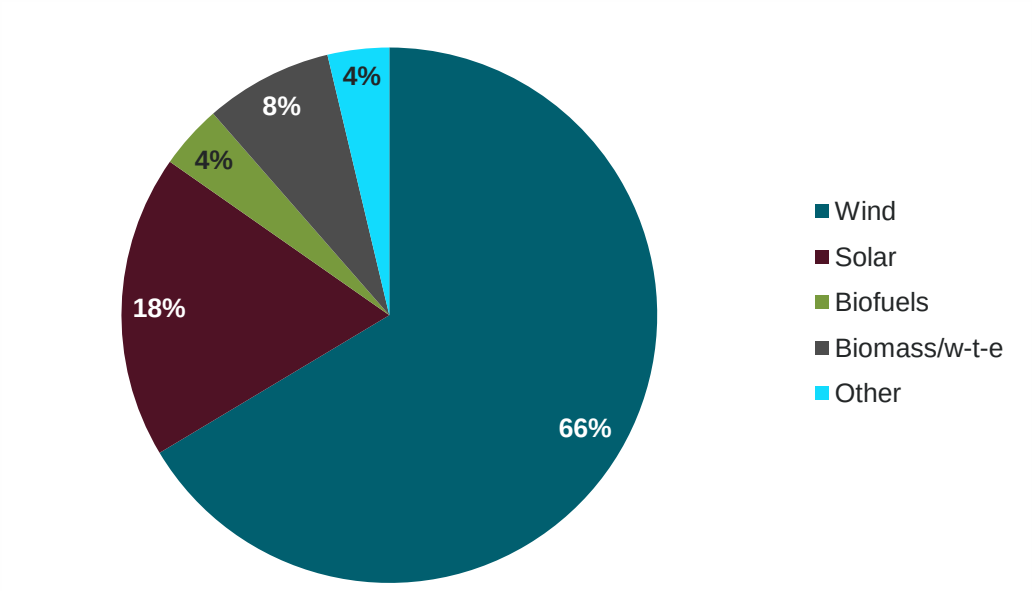
In 2010, global levels of investment in renewable energy and fuels hit $211 billion, up 32% from the $160 billion invested in 2009[1]. Investment in the solar sector reached $26.1 billion in 2010, up three per cent from 2009 levels[2]. Though wind technology attracted the highest levels of investment in 2010 ($94.7 billion), solar technology accounted for a higher proportion of total investment than biomass/waste-to-energy, biofuels, small hydro, and geothermal projects, and had the highest compound annual growth rate of all technologies from 2004 to 2010 (91%)[3].

[1] United Nations Environmental Programme. (2011). Global Trends in Renewable Energy Investment.

[2] ibid

[3] Ibid.

FIGURE 1: GLOBAL FINANCIAL NEW INVESTMENT, BY RENEWABLE TECHNOLOGY, 2010[4]



Source: Derived from United Nations Environment Programme (UNEP) 2011 by Millier Dickinson Blais, 2011

It should be noted that total levels of investment by technology do not include small-scale projects. Based particularly on small roof-top installations of PV technology subsidized by feed-in tariffs across Germany and other European countries, investment in solar technology was well ahead of other renewables in 2010 for small-scale projects[5]. Technological advancement has played a key role in the growth of solar as well, especially for small-scale installations. The current price of solar energy per MW has fallen approximately 60% since 2006, which has almost placed the technology on a level playing field with the current retail price of electricity[6].

The majority of new investment in solar technology came from private equity and venture capital sources in 2010. Approximately $2.2 billion in new solar investment came from these sources, which accounted for the highest shares of private and venture capital financing of all renewable technologies[7]. Thus in 2010, solar remained an attractive destination for early-stage investment. Investment from public markets and asset financing activities primarily focused on wind technologies in 2010, though solar was second for both sources[8].

Investments in renewable and solar energy technologies also varied by geographic region in 2010. For the first time, the broad segment of renewable energy investment in developing nations exceeded that of more developed economies. New financial

[4] "Other" includes small hydro, geothermal, and marine projects.

[5] UNEP. (2011). Global Trends in Renewable Energy Investment.

[6] Ibid.

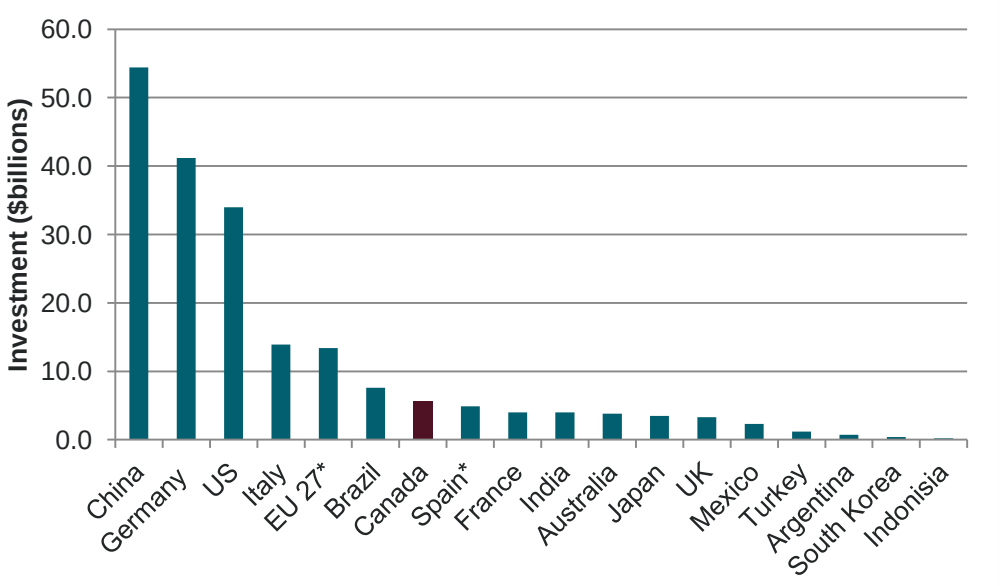
[7] Ibid.

[8] Ibid.

investment – excluding small-scale projects and R&D investments – reached $72 billion in developing nations, while investment reached $70.5 billion for developed economies[9]. With this being said, government investments in R&D and small-scale project implementation and investment are still more heavily rooted in developed economies, based on technological expertise and ability to provide government subsidies[10].

Overall, China accounted for the highest levels of renewable energy investment in 2010 ($54.4 billion), with other traditional leaders Germany and the US each exceeding $30 billion in investment as well ($41.2 billion and 34.0 billion respectively)[11]. The figure below outlines the size of renewable energy sectors across the globe by total investment in 2010.

FIGURE 2: RENEWABLE ENERGY INVESTMENT IN SELECT G-20 MEMBERS, 2010



* Spain, a member of the EU27 group of countries is profiled separately based on its status as a traditional leader in renewable energy investment. Data for Spain is excluded from the EU27 data above.
Source: Derived from The PEW Charitable Trust, Who's Winning the Clean Energy Race? 2010, by Millier Dickinson Blais, 2011

In terms of growth between 2005 and 2010, some of the smaller countries experienced the highest levels of investment growth. Argentina grew 115% between 2005 and 2010, primarily based on government programs (production tax credits and exemptions, feed-in tariffs, and guaranteed fixed prices) and a priority of displacing oil

[9] UNEP. (2011). Global Trends in Renewable Energy Investment.

[10] Ibid.

[11] The PEW Charitable Trust. (2010). Who's Winning the Clean Energy Race?

consumption with biofuel production/consumption[12]. Similarly, Turkey's five-year investment in renewable energy grew by 115%, primarily based on feed-in tariffs and tax exemptions/credits focused on the wind energy sector – which accounted for 76% of the Country's renewable energy investment[13]. The largest renewable energy markets, China, Germany, and the US, also posted strong five-year gains – 88%, 47%, and 61% respectively[14].

Solar energy was one technology still firmly rooted in developed nations. New financial investment was weighted more towards developed economies, which generated $18.9 billion in investment as opposed to $7.2 billion from developing nations[15]. Some of the key solar energy highlights in leading developed nations from 2010 included[16]:

- Investment of $5.5 billion in solar energy based on subsidies and diminishing costs of PV technology in the US.
- Asset financing investment of $3.1 billion in Italy, based on generous feed-in tariff policies.
- Small-scale project investments of $34.3 billion (growth of 132% since 2009) in areas such as roof-top PV modules.
- Cuts to feed-in tariff policies in Spain from 7-30%, which is predicted to have an effect on project economics for all types of renewable technologies.
- Introduction of a feed-in tariff program in the UK focused on small-scale installations, which generated an increase of 45MW of new solar capacity.

China led the way for developing nations, based on large scale, debt financed, stimulus investments in 10 solar manufacturing companies. China now produces over half of the PV modules used globally based on manufacturing advancements[17]. India also accounted for increasing investment in solar, primarily as a result of government initiatives to add one Gigawatt of solar power to the national grid by 2013[18]. Other developments in Africa – primarily a 100 MW solar thermal project in Egypt, and a planned 500 MW solar thermal installation in Morocco – further added to investment in developing nations[19].

Investment in solar was shaped by a few less desirable trends in 2010 as well. A number of countries, including Spain, Czech Republic, Germany, and Italy made efforts to cut feed-in tariff rates for new or existing PV installations. Domestically, the Province of Ontario cut its own feed-in tariff rate for small-scale ground-mount solar

[12] The PEW Charitable Trust. (2010). Who's Winning the Clean Energy Race?

[13] Ibid.

[14] Ibid.

[15] UNEP. (2011). Global Trends in Renewable Energy Investment.

[16] Ibid.

[17] UNEP. (2011). Global Trends in Renewable Energy Investment.

[18] Ibid.

[19] Ibid.

projects from 80.2 cents per kilowatt hour (kWh) to 64.2 cents per kWh in 2010[20]. Steps like these affected confidence in the various governments that have proposed attractive feed-in tariff rates, and the potential for longer-term commitment to supporting solar projects. Further challenges emerged throughout the year from other sources of electricity. Natural gas prices stayed well below their peak from 2008 for most of 2010, leading to a resurgence of gas-fired generators in the US and Europe, and less incentive for alternative energy contracts[21]. Market scepticism, primarily based on weak renewable energy stock performance and diminished importance of renewable energy on various government agendas, also challenged renewable energy investment in 2010[22].

2.2 National Trends and Context

Factors like Canada's skilled workforce, a comparatively sound financial system, strong infrastructure, and a relatively desirable tax environment has led to growth of renewable energy investment in Canada. In 2010, there was $5.6 billion in renewable energy investment in Canada, after a five year growth rate of 52%[23]. This places Canada seventh among the other G-20 countries in terms of total clean energy investment in 2010. By 2010, the total renewable energy capacity in Canada reached 7.4 GW, with wind, biomass, and hydro holding leading shares of that capacity[24].

Across Canada, wind technology captured the highest proportion of investment between 2005 and 2010. Solar technology captured 13% of investment during that time, just after other forms of renewable (i.e. biomass, hydro). Much of the total investment across the country has been based on key investment incentives, primarily offered through provincial governments. These include generation-based subsidies and feed-in tariffs, as well as preferential loan programs. At the federal level, policies to support clean energy include tax incentives (such as the Scientific Research & Experimental Development program) and auto efficiency standards.

[20] Ontario Power Authority. (2010, August 13). Ontario Power Authority finalizes price for new ground-mounted solar category.

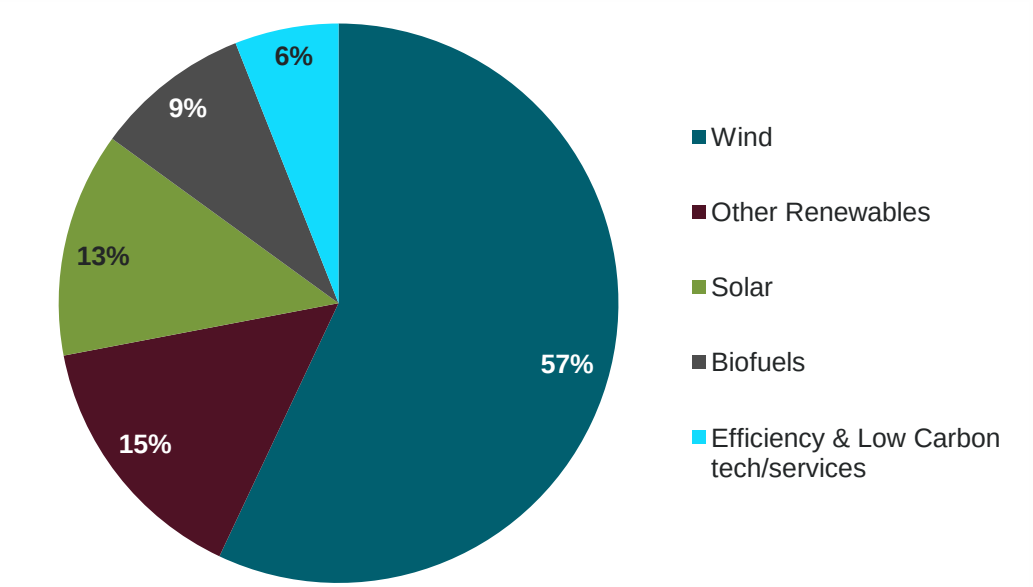
[21] UNEP. (2011). Global Trends in Renewable Energy Investment.

[22] Ibid.

[23] The PEW Charitable Trust. (2010). Who's Winning the Clean Energy Race?

[24] Ibid.

FIGURE 3: DISTRIBUTION OF INVESTMENT BY SECTOR (2005-2010)



Source: Derived from The PEW Charitable Trust, Who's Winning the Clean Energy Race? 2010, by Millier Dickinson Blais, 2011

In terms of capacity, the Canadian solar industry has grown significantly over the last decade. From 1998 to 2007, the installed photovoltaic capacity across the country went from 4.5 MW to 25.8 MW, or a more than quadruple increase in capacity[25]. During roughly the same time period, the cost of solar PV modules dropped dramatically, from $11.09 per watt in 1999 to $4.47 per watt in 2007[26]. At the time the study was drafted, solar PV was forecasted to drop to a price of approximately $3.88 per Watt for turn-key solutions by 2015[27].

By 2007, the growth of PV was distributed into a number of different sub-markets, including both on-grid (connected to the utility grid) and off-grid (not connected to the utility grid) developments. By 2007, the majority of PV power capacity across Canada was contained in off-grid non-residential development, which accounted for 2,480 kW of PV capacity[28]. Off-grid residential and on-grid distributed (installed on consumer's premises) generally accounted for similar levels of solar capacity in 2007.

Solar thermal systems grew similarly. Annual domestic collector sales in thermal solar systems went from 20,368 square metres to 60,910 square metres, or an increase of almost 200% between 1999 and 2007[29]. The solar heating segment is comparatively

[25] Electricity Sector Council. (2009). Labour Force Survey of the Canadian Solar Industry.

[26] Ibid.

[27] DENA. (2008). Preliminary Report on Ontario IPSP.

[28] Electricity Sector Council. (2009). Labour Force Survey of the Canadian Solar Industry.

[29] Ibid.

stronger in Canada than in other nations – a number of the collection systems installed in Canada are also manufactured in Canada.

ECO (Environmental Careers Organization) Canada released its most recent profile of Canadian green economy employment in 2010. The report found that across Canada, there are an estimated 682,000 people employed in environment-related occupations[30]. Proportionally, this accounted for 4% of the total Canadian workforce – up from a 3% share in 2007[31]. The report also suggested that workers in Canada's green economy are highly educated – with 37% having obtained at least a bachelor's degree. Across the entire green economy, which includes renewable energy, employment is generally growing in importance across Canada.

The Electricity Sector Council completed a labour force survey of the Canadian solar industry in 2009. The intent of the study was to determine the labour force trends likely to occur in the national solar sector to the end of 2011, as well as characterize the industry at the time (late 2008). A total of 1,524 full-time equivalents (FTEs) were employed in the industry in 2008 - by 2011, that figure was expected to have grown to 3,069[32]. The majority of these existing positions (65%) fell within manufacturing operations, sales, research, quality control, project management, and engineering activities[33].

At the time of the survey, solar companies expected significant growth of the sector, despite the economic uncertainties that were facing the industry at the time. Overall, businesses expected the number of FTEs in the solar industry to have grown by 101% by the end of 2011 (since 2008)[34]. Despite this growth though, 51% of solar companies were suggesting that they would be experiencing labour force shortages in a number of areas: installation (78%), systems design and integration (51%), project management (40%), and engineering (40%)[35].

The Canadian solar industry and the provincial policy packages to encourage the development of solar energy, vary by province as well. For Alberta, the Micro-generation regulation, developed in 2008 by Alberta Utilities Commission (AUC), allows electricity customers to generate their own environmentally friendly electricity (including solar) in installations of between 150 kilowatt and 1 MW capacity, and receive credit for surplus electricity exported to the grid. Micro-generators arrange for compensation with their individual electricity retailers, but export of electricity to the grid is generally measured in one of two ways, which affects the rate a micro-generator is compensated at[36]:

---

[30] ECO Canada. (2010). Profile of Canadian Environmental Employment: Labour Market Research Report.

[31] Ibid.

[32] Electricity Sector Council. (2009). Labour Force Survey of the Canadian Solar Industry.

[33] Ibid.

[34] Electricity Sector Council. (2009). Labour Force Survey of the Canadian Solar Industry.

[35] Ibid.

[36] Alberta Utilities Commission. (2008). Micro Generator Application process and Guidelines. (Version 1.0)

- With a bi-directional cumulative meter, micro-generators are paid for the exported electricity at the same price at which electricity is purchased from the retailer, minus any delivery charges incurred by the customer; or,
- With an “interval” meter, which stores energy at 15-minute intervals and allows the utility to offer compensation at the system marginal price of Alberta’s wholesale energy market – a price that varies every few minutes based on supply and demand, but could generally be as low as $0.01 per kWh in the evening to as much as $1.00 per kWh in certain emergency supply situations.

The AUC micro-generation regulation expires in 2013, with an option to renew or amend the policy at that time. No other solar-specific policies currently exist in the province. A number of other provinces have renewable energy/solar-specific policies in place to encourage renewable energy generation, as summarized in the figure below. Many of the provinces across Canada, such as Yukon, Saskatchewan, and Ontario, have programs tied to the federal ecoEnergy programs, which aim to increase Canada’s supply of renewable energy generation and retrofit systems and structure for energy efficiency.

FIGURE 4: SELECT PROVINCIAL RENEWABLE ENERGY PROGRAMS AND POLICIES

Province or Territory	Select Policies and Programs
British Columbia	■ Solar hot water systems installation rebates through LiveSmart BC, in addition to federal rebates through the ecoEnergy Retrofit for Homes Program. ■ Provincial sales tax exemption for material and equipment used to conserve energy or produce electricity from renewable energy sources[37]. ■ Standing offer program through BC Hydro, which allows the utility to purchase energy from small renewable energy projects between 0.05 MW and 10 MW at between $12/MW and $22/MW based on the region[38].
Manitoba	■ Residential Earth Power Loan, which provides loans of up to $7,500 per eligible residence to install solar water heating systems[39]. ■ Net metering policies for connecting customer owned generation (less than 10 MW) installations to the provincial grid for credit or sale.
New Brunswick	■ Energy efficiency incentives through the Province of New Brunswick (Efficiency NB) in areas like residential solar domestic hot water systems ($2,500), or capital project development assistance for small to large businesses. ■ Net metering policies for connecting distributed renewable energy installations to the provincial grid through New Brunswick Power.
Northwest Territories	■ The Alternative Energy Technologies Program (AETP) offered by the Government of the Northwest Territories is designed to promote the use of renewable energy sources, including PV and thermal solar. The program is focused on community-wide installations (Community Renewable Energy Fund, maximum of $50,000 per year), commercial businesses wishing to install alternative energy technologies (Medium Renewable Energy Fund, maximum of $15,000 per year), and residents (Small Renewable Energy Fund, maximum of $5,000 per year)[40].
Nova Scotia	■ Commercial/industrial/Residential rebate programs delivered through

[37] BC Hydro. (2011). B.C. Business Incentives. http://www.bchydro.com/rebates_savings/bc_business_incentives.html

[38] BC Hydro. (2011). Standing Offer Program – Report on the SOP 2-Year Review.

[39] Manitoba Hydro. (2011). Solar Water Heating. http://www.hydro.mb.ca/your_home/solar_water_heating/index.shtml

[40] Government of Northwest Territories. (2011). Alternative Energy Technologies Program. http://www.enr.gov.nt.ca/_live/pages/wpPages/aetp.aspx

	Efficiency Nova Scotia, and focused on solar air and water heating technologies. ▪ An enhanced net metering program, which allows residential and commercial users to connect renewable energy installations of less than 1 MW to the provincial grid, with credits and cash payments equal to what the customer pays for energy from the distribution grid[41].
Ontario	▪ Feed-in Tariff programs from Ontario Power Authority focused on renewable projects below (microFIT) and above 10 kilowatts (FIT). Solar contracts under the FIT program range from $0.44 per kWh to $0.80 per kWh based on type and capacity of the installation. ▪ A net metering program through Hydro One to off-set the costs of energy with renewable energy generation of 500 kW or less.
Prince Edward island	▪ Provincial sales tax exemptions on small-scale renewable energy systems like solar thermal and PV systems with a rating of 100 kW or less[42]. ▪ Net-metering systems regulations under the *Renewable Energy Act* allowing for the connection of energy generators up to 100 kW in size to the Provincial grid, with the customer credited at the retail price for energy[43].
Quebec	▪ Net metering option from Hydro Quebec, which allows renewable energy generators, including users of solar PV, to feed surplus energy into the provincial grid for credits in kWh.
Saskatchewan	▪ The Solar Heating Initiative for Today (SHIFT) program through the Province of Saskatchewan, aimed at matching federal ecoEnergy grants for the installation of solar water heating systems. ▪ Net metering program through SaskPower, which allows individuals to export surplus energy generated from renewable sources to the provincial grid, paired with Go Green funding aimed at a reimbursement of up to 35% of eligible project costs (to a maximum of $100,000) for the installation of renewable energy projects of 100 kW or less[44].

[41] Nova Scotia Power. (2011). Enhanced Net Metering. http://www.nspower.ca/en/home/environment/renewableenergy/enhanced/default.aspx

[42] PEI Department of Finance and Municipal Affairs. (2011). PST Exemption on Renewable Energy Equipment. http://www.gov.pe.ca/finance/index.php3?number=1012183&lang=E

[43] Maritime Electric. (2011). Renewable Energy. http://www.maritimeelectric.com/environment/env_energy.asp

[44] SaskPower. (2011). Net Metering. http://www.src.sk.ca/html/research_technology/energy_conservation/net_metering/index.cfm

2.3 Local Trends and Context

Southeastern Alberta's regional economic activity has largely been concentrated in the energy (natural gas), agricultural, metal fabrication, technology and transportation industries. Initially, the City explored renewable energy when its supplies of accessible natural gas were dwindling, and conservation measures and alternative energy options became a focus in the early 2000's. The City of Medicine Hat launched its first renewable energy pilot project as part of the Alberta Solar Showcase in 2006. The program assisted 20 Alberta municipalities to install and grid-connect small solar PV systems in public buildings ranging from under one kW to two kW. Designed to inform and educate municipal leaders, administrative staff, facility maintenance personnel and utility providers about grid-connected solar PV systems, the project was spearheaded by Climate Change Central (C3) and supported financially by the Federation of Canadian Municipalities. The pilot involved the installation of a one kW solar electric system on the roof of the Medicine Hat Library. During the first year after installation, the system generated 1,300 kWhs and allows the Library to use all available solar energy before it draws electricity from the City of Medicine Hat Electric Utility. Industry stakeholders repeatedly noted that the City has been an innovator in the solar industry and continues to be proactive in this sector.

Consultation Highlight:

"We are an electrical island; we own our natural gas, our generation system, and our grid. We are self-sufficient and that allows us to be innovative."

As a result of the Alberta Solar Showcase, the Province released new regulatory requirements for micro-generators, making it easier for solar PV systems to connect to the power grid. While the move made it easier for solar PV developers, it did not provide an incentive for them to develop this type of power generation system. The Micro-Generation Regulation expires in 2013, and will be reviewed by government when there are 3000 micro-generators installed, or 25,000 kW of micro-generation capacity.

The lack of incentives has further contributed to an industry that, provincially, suffers from a lack of awareness. Overall, few are aware of southeastern Alberta's prime conditions for solar PV generation. Other challenges include regulatory issues, longer payback periods, relatively low energy conversion efficiency, and issues of solar energy storage. However, South East Alberta is well positioned in the face of these challenges; the City of Medicine Hat owns its own electric utility, meaning that regulatory issues are fairly minor, and the region is aware of, and very interested in, the economic potential of the solar industry.

Consultation Highlight:

"In 2010, the City won the Emerald Award for Environmental Excellence in Alberta. In 2011, the HAT Smart program won again, this time at the Federation of Canadian Municipalities [The Sustainable Community Award for Energy]."

The commitment to alternative energy in South East Alberta is obvious; the City of Medicine Hat's residential incentive program provided an incentive (called HAT Smart) of $3000 for solar water heating and $6000 for solar electric in its first year. It was quickly oversubscribed. On the commercial side, HAT Smart will fund 50% of the install cost for solar thermal (up to 50,000$) and renewable energy HAT Smart II, the program's successor, had a significantly reduced budget due to the City's reduced income from natural gas sales, offering only $1000 for solar electric and $500 for solar water heating. Commercially, the rebate has decreased to $20,000; as a result the program has seen significantly less success this year, with much fewer applicants. Regardless, the City's HAT Smart Programs have had the highest per capita response

from consumers because they stack with federal and provincial programs. The City is currently developing HAT Smart III for 2012.

2.4 Best Practices in Solar Energy Investment Attraction

Approaches in attracting renewable energy investment vary significantly between jurisdictions and levels of government. However, generally speaking, major drivers of cluster development are dependent on political will and commitment[45] and include policy measures such as:

- Investment promotion
- Strong domestic market
- Investment incentives
- Industrial fit
- Favourable infrastructure
- Cost advantages
- Research institutions and universities
- Public awareness and support[46]

The following section outlines the approaches to solar energy investment attraction taken by a number of jurisdictions in North America, with each of the examples illustrating particular methods of renewable energy investment attraction. The first case study of Ontario, highlights the Province's Green Energy Act and Feed-in Tariff policy, the second case study in New Jersey examines the successes and impediments to a quota system and market mechanisms, the third case study of the City of Boston looks at the use of public-private partnerships and tendering policies to fuel solar investment and finally we will examine Summerside, PEI and their municipal ownership of their utility company and renewable energy resources. The table below highlights key characteristics of each of their policies and their comparative advantages in relation to each other.

It is important to remember that although each of these jurisdictions has chosen a specific policy route they have also utilized a number of varying and different program options that ensure that investment attraction is successful. Attracting solar energy investment requires a holistic policy that incorporates a variety of methods and each of these best practices highlights this similar theme.

[45] Apricum (2010). Presented at: The World Bank Knowledge Economy Forum

[46] Ibid.

FIGURE 5: KEY FINDINGS MATRIX

	Feed-in Tariffs (Ontario)	Renewable Portfolio Standard/Quota (New Jersey)	Tendering Policies (Boston, MA)	Municipally-owned corporations (Summerside, PEI)
Key Characteristics	▪ Gov't mandates tariffs ▪ Take or pay obligation for utilities ▪ Focus on new and emerging technologies ▪ More compatible with regulated markets	▪ Gov't mandates share of RE energy ▪ Requirement placed on producer or distributor ▪ More compatible with deregulated markets	▪ Gov't sponsors competitive bidding process ▪ Award to lowest cost bid ▪ Gov't pays increment, cost of RE	▪ Gov't owns and operates utility systems and renewable energy generators ▪ Investments are made in smart grid technology
Success Factors	▪ Long term contracts (15-20 years) ▪ Guaranteed buyer ▪ Tariffs that provide reasonable ROR ▪ Flexibility to capture cost efficiencies	▪ Policy design ▪ Output-based targets that increase over time ▪ Effective enforcement ▪ Creation of certified trading platform	▪ Long term contracts to reduce investor risk ▪ Economies of scale ▪ Annual process ▪ Effective penalty system ▪ Stable funding	▪ Economic viability ▪ Reinvestment of profit into new technology and the grid ▪
Pros	▪ Must successful in increasing adoption of RE in Europe	▪ Good at cost and price minimization	▪ Best a price minimization	▪ Local control over development
Cons	▪ May be more expensive in the short run	▪ Favours incumbent operators and established technologies ▪ More complex	▪ Requires gov't subsidies (rather than passing on increment, cost to buyers)	▪ Cost of maintenance and upkeep.

FIGURE 6 KEY FINDINGS - COMPARATIVE ADVANTAGES

	Feed-in Tariffs (Ontario)	Renewable Portfolio Standard/Quota (New Jersey)	Tendering Policies (Boston, MA)	Municipally-owned corporations (Summerside, PEI)
Comparative Advantage (++ very strong; + strong; - disadvantage)				
Price reduction		+	++	
Diversity of technologies	+			
Sustainability of approach	+	+		+
Local industry development	+			+
Investor risk mitigation	++	+	-	+
Simplicity of design	+	-		++

Partnership International: Sustainable Development

2.4.1 Province of Ontario's Feed-in Tariff (FIT) Program

Like many jurisdictions throughout Europe, the Province of Ontario has implemented a Feed-In Tariff (FIT) program that has bolstered the development of renewable energy investment in the province.

The FIT Program was enabled by the Green Energy and Green Economy Act which was passed into law on May 14, 2009. The Ontario Power Authority is responsible for implementing the program. The FIT Program is open to a variety of generators, project sizes and renewable fuel types. The principal requirements are that the project be in Ontario and be fuelled by a renewable fuel source over 10kW and below 500kW. The project

Ontario's feed-in tariff or FIT Program is North America's first comprehensive guaranteed pricing structure for renewable electricity production. It offers stable prices under long-term contracts for energy generated from renewable sources of energy. The program provides a way to contract for renewable energy generation. It includes standardized program rules, prices and contracts for anyone interested in developing a qualifying renewable energy project. Prices are designed to cover project costs and allow for reasonable return on investment over the contract term.

Built into Ontario's FIT program are domestic content requirements which seek to bolster the local economy by requiring investment in the renewable energy value chain. The minimum required amount of Ontario-based content will increase over time and is

determined by the year of a project's milestone date for commercial operation. The minimum requirements are:

Wind Projects over 10kW		Solar Projects over 10kW	
Minimum domestic content level	Milestone date for commercial operation	Minimum domestic content level	Milestone date for commercial operation
25 percent	2009 to 2011	50 percent	2009 to 2010
50 percent	2012 and later	60 percent	2011 or later

Source: Ontario's FIT Program

The Province's current rate schedule for solar PV can be seen below. These rates far exceed the consumer prices paid for power.

Feed-In-Tariff Program Price Schedule (Solar PV)			
Renewable Fuel	Size tranches	Contract Price ¢/kWh	Escalation Percentage
Solar PV			
Rooftop	≤ 250kW	71.3	0%
Rooftop	> 250 ≤ 500kW	63.5	0%
Rooftop	> 500kW	53.9	0%
Ground Mounted	≤ 10MW	44.3	0%

Source: Ontario's FIT program

2.4.1.1 Key Findings

By implementing an aggressive feed-in tariff program and by requiring a certain percentage of domestic content Ontario has been successful in beginning to develop a renewable energy market. This market continues to be heavily subsidized by the provincial government, however, investments throughout the value chain have been successful. Not only is Ontario generating increasing amounts of green energy through the construction of renewable systems including solar systems, there has also been increased investment in research and development and production facilities throughout the province. Currently, the Ontario Power Association estimates nearly 20,000 green jobs and $9 billion in business investment could arise as a result of FIT-approved projects across a number of different renewable energy technologies. Currently, photovoltaic solar energy comprises approximately 80% of FIT-approved projects.

Most notably Ontario has negotiated an agreement with Samsung C&T Corporation and the Korea Power Electric Corporation, which will triple Ontario's renewable and solar energy generation and lead to manufacturing facilities being constructed in Ontario. The agreement will lead to more than 16,000 green energy jobs over 6 years and bring $7 billion of renewable generation investment to Ontario. The Consortium is also committed to operating four manufacturing plants that will produce wind turbine towers, wind blades, solar inverters and solar assembly creating 1,440 manufacturing and related jobs in the sector.

A FIT program model is relatively simple to manage but requires significant capital subsidization by the funder throughout the lifespan of the long-term contracts. Ontario's FIT program emphasizes the success that a FIT program can have although this is not without controversy. Many opponents to this strategy feel that the prices allotted to the renewable energy providers are too high and that the subsidization of private businesses by the government is unnecessary. With this being said, Ontario's programming has been quite successful to-date and great headway has been made in demonstrating that Ontario is becoming a cluster for green energy production and clean tech technology as well.

2.4.2 New Jersey's SREC and Quota Program

In January 2002, New Jersey Governor Jim McGreevey appointed Jeanne Fox to serve as president of the Board of Public Utilities. Fox aggressively developed and expanded them renewable energy programs in the state, especially the Customer On-Site Renewable Energy Rebate (CORE). CORE provided rebates for just 60 PV systems in 2003; in 2006 alone, this figure climbed to over a thousand[47]. In 2005, the Solar Energy Industries Association (SEIA) honoured Fox as one of three national champions. Although this program was successful in attracting large amounts of investment, the costs of the rebate program were deemed economically unviable and New Jersey quickly had to find a more cost-effective approach to renewable energy attraction.

New Jersey's CORE program was continued, but dramatically scaled down and combined with a legislated quota system and the sale of Solar Renewable Energy Certificates (SRECs), a solution which has continued to bolster the solar energy market in the state. New Jersey currently has the second highest solar investment in the United States, second only to California[48].

Solar Renewable Energy Certificates each certify that one megawatt-hour of electric power has been generated by a solar system. Electricity companies in New Jersey are required by the state law to use solar systems to generate a certain amount of power every year[49]. This quota system legislates that if they do not own enough solar generating capacity to meet this requirement, they may purchase SRECs to do so. The sale of SRECs to electricity companies thus provides one way for the PV system owners to recoup their investment.

However, the value of any particular SREC is uncertain until it is sold. SRECs will be created over a decade or more as PV systems produce power, and supply and demand will determine its price. The market for SRECs is continuing to evolve, and

[47] Hart, David M. (2009). Making, Breaking, and (Partially) Remaking Markets: State Regulation and Photovoltaic Electricity in New Jersey. MIT Energy Innovation Working Paper.

[48] Hunter, Scott. New Jersey Solar Policy Innovation. New Jersey Board of Public Utilities, Office of Clean Energy

[49] U.S. Department of Energy (2011). Solar Powering Your Community: A Guide for Local Governments.

with increased quotas placed on local utility companies this program could result in significant private investment.

2.4.2.1 Key Findings

New Jersey's solar energy investment trajectory provides many valuable insights into the creation of a viable renewable energy investment strategy. Firstly, it is possible to fuel explosive growth in solar capacity through generous subsidies (as seen in the State's initial CORE programming), however, calibrating the subsidy to a level that is fiscally sustainable can be quite challenging.

Utilizing quota-based systems to provide a positive climate for market-based alternatives including Solar Renewable Energy Certificates (SRECs) is a potentially valuable process and can generate increased investment in renewable energy investment. Market-based alternatives do not address the front-loaded capital costs of installing solar systems, therefore, governmental solutions to this capital gap including tax rebates and subsidies can be extremely useful in providing the security needed to finance these projects.

The use of market-based solutions to incentivizing renewable energy investment is cost-effective way in which to fuel the development of solar projects. It decreases the cost of rebate programs needed and allows for greater competition in the private sector. By creating benchmarks for businesses, municipalities and other entities in an area to commit to installing solar PV systems the conditions for investment in the marketplace will be increased.

2.4.3 The City of Boston's Solar Strategy

In June 2007, the City of Boston became one of thirteen inaugural Solar America Cities under the Solar America Initiative of the U.S. Department of Energy (DOE) and launched Solar Boston, a half-million-dollar program to encourage widespread adoption of solar energy in Boston. Through Solar Boston, the City must:

- Develop a strategy for the installation of solar technology throughout Boston, including mapping feasible locations, preparing a project-labour agreement and planning the city-wide bulk purchase, financing and installation of solar technology
- Work with local organizations to maximize Boston's participation in state incentive programs and innovative financing initiatives
- Create a successor non-profit organization to implement long-term goals of the partnership in cooperation with the Boston Energy Alliance

There are three key components of Boston's solar policy, these are:

- **Solar Boston Residential Rebate Program**: A $3,000 rebate that can be sought on top of both Federal and State rebates to dramatically reduce the initial costs of solar installation. The city-wide rebates require home owners to make investments in home efficiencies before qualifying for a solar rebate and has pre-approved eight

PV installers (through a competitive bidding process) in the City to offer rebates under the program.

- **Mayor's Innovation District Solar Challenge**: The Innovation District Solar Challenge is part of the Mayor`s comprehensive effort to promote solar technology in Boston. The Innovation District, 1,000 acres of residential, commercial and industrial space along the South Boston Waterfront, is intended to ensure Boston`s continued leadership in the innovation economy. The City will pre-approve a number of commercial installers (through a competitive process) to attend a variety of marketing and networking events with Innovation District building owners[50]. This component will serve as an educational platform to inform Boston business owners about this financially attractive technology.
- **Solar Boston Map Updates**: The City of Boston has developed an interactive GIS program and made it available online that maps the completed solar projects around the City and those currently under construction. The map can zoom into particular neighbourhoods and highlights which buildings have the PV installed.

A number of other initiatives have taken place in the City including: reforming solar permit fees, streamlining the PV permitting system and workforce development training. These initiatives work to create a climate conducive to increased solar investment in the City.

2.4.3.1 Key Findings

The City of Boston has been extremely successful at harnessing popular support and creating relationships and partnerships with private industry in the solar energy sector. These two components are vitally important to the success of solar energy investment attraction. By enlisting the support of local residents and businesses and by incentivizing their investment in the solar industry through rebates, the City has fostered a favourable climate for local installers.

In addition, it is important to build relationships within the private sector in order to offer support and leverage assets to the business community in the solar industry. By creating relationships with members of the sector you can better determine initiatives and policies that can benefit investment attraction and small business growth within the region. The relationships established in the solar sector by the City of Boston were first based on a competitive process ensuring that the businesses utilized for projects were cost effective and appropriate.

The City of Boston has also created a climate in which solar energy investment can easily thrive. They have streamlined the permitting system for PV development and developed workforce development training to ensure that all segments of the solar energy value chain can be serviced by the workforce available in Boston. By ensuring that public support is behind a solar energy investment initiative, as well as utilizing

[50] City of Boston Office of the Mayor (2011). Requests for Qualifications: Renew Boston Solar - Innovation District Solar Challenge.

competitive bidding processes and streamlining government processes, a region can increase the opportunities so business development in the sector.

2.4.4 The City of Summerside's Innovative Investments

The City of Summerside owns and operates its own electric utility and services approximately 6600 residents and businesses. The City has begun to heavily invest in renewable energy, currently owning and operating a Wind Park on the northern municipal boundary of the City. There are four turbines, totalling 12MW of electrical power output. This $30 million wind farm is providing a net amount of about $1 million a year for the municipality and supplies about 25% of the City's power needs. In addition, the City also purchases 9MW of energy from the West Cape wind farm to which they have twenty year supply contract. In total these green energy sources supply 46% of the City`s needed energy.

Currently, Summerside's excess power is sold to NB Power, however, smart meter technology will make it possible to retain this resource within the City and store it for future use. The City of Summerside constructed the Summerside Wind Farm in 2009 and the roll out of a Smart Meter Pilot Project to better utilize the renewable energy generated has been undertaken. The City of Summerside invested $2 million in 400 meters for the pilot project. The remaining 6,600 customers of Summerside Electric Utility would be eventually phased in to the Smart Meter Program over time[51]. The implementation of this Smart Meter Program has the potential to launch Summerside ahead of most communities in the province in green energy independence and cost savings.

The intent of the Smart Meter Program is to control consumer loads to the benefit of the environment, Summerside Electric Utility and consumer, while allowing for the maximum integration and usability of non-dispatchable renewable electric generation (wind power). The consumer will be able to track in real time exactly what is happening with electricity use and how it is helping the environment.

In addition to the smart metre, the smart grid will continue to be developed and enhanced through implementation of the smart heating devices (space and water heating). When the wind is available, during NB Power's low-rate periods, residential electric thermal storage units (for space heating) and hot water heaters (for domestic hot water heaters (for domestic hot water) are to be charged from the wind, while during the high rate periods, on-demand electricity is to be met from the wind.

2.4.4.1 Key Findings

Summerside's ownership of its utility has provided it with the flexibility to invest in projects that continue to allow it to innovate and grow. By owning its own wind farm as well contracting the West Cape wind farm Summerside has become largely energy

[51] Carson, M. 4 May, 2011. Journal Pioneer. http://www.journalpioneer.com/News/Local/2011-05-04/article-2476760/Council-puts-halt-to-Smart-Meter-Program/1

self-sufficient, and can even sell some of the energy generated to New Brunswick Power. These renewable energy projects have been extremely economical for the City and have provided revenue which has then been successfully reinvested to support the renewable energy sector and smart grid technology.

By introducing smart grid technologies and continuing to invest in the utilities infrastructure the City of Summerside's Utility Corporation is able to maximize efficiency of their green energy and increase the amount of energy able to sell to neighbouring utility grids namely NB Power. By capitalizing on new technologies and innovative solutions afforded to it by direct ownership and fair profit margins the City of Summerside has become a leader on Canada's Atlantic coast in renewable energy investment and development.

3 Workforce Overview

3.1 Occupational Structure of the Solar Industry

Jobs that fall within industries concerning environmental technologies or processes, including solar, have become commonly known as “green collar jobs”. ECO Canada defines a green job as one that works directly with information, technologies, or materials that minimize environmental impact, while also requiring specialized skills, knowledge, training, or experience related to these areas[52]. Green jobs are less distinct by their job title but rather earn the “green” distinction by the additional skills and knowledge that may be necessary to complete the core function. Similar activities and processes may be required in the “traditional” economy, but with the application of knowledge and skills that reflect new technologies, new materials, or new processes, these jobs become “green”. According to the United Nations Environmental Programme (UNEP), the demand for green jobs will affect employment in at least four ways: job creation, job substitution, job elimination without direct replacement, and finally job transformation as skill sets are redefined according to “green” demands.

With projected growth of the solar industry, it is inevitable that industry-specific employment opportunities will be created through various stages of solar power development across Canada, and particularly in areas that are geographically well suited to solar development, including southeast Alberta.

The supply chain for the life cycle of solar photovoltaic projects consists of three major phases: project development, construction and power generation. In each of these phases, direct and indirect jobs result.

The solar PV industry is still, however, relatively young. Some jobs require skills which are transferable from within an existing discipline while other jobs will require some additional training. There has been significant work completed to best identify occupations that will exist within this emerging industry. Figure 7 below outlines the occupational profile of the industry as described through the Workforce Planning Boards in Ontario. It should be noted that many of the current job opportunities involve market development. However as the sector continues to experience growth, further opportunities will occur in solar panel and inverter manufacturing.

[52] ECO Canada, Defining the Green Economy, Labour Market Research Study 2010

FIGURE 7: SOLAR PHOTOVOLTAIC OCCUPATIONAL PROFILE

Occupation	National Occupation Classification (NOC) Code
Business Development Officers/Rural Development	4163
Construction Inspectors	2264
Construction Trades Helpers and Labourers	7611
Contractors Supervisors/Other Construction Trades	7219
Electrician	7241
Energy Economist	4162
Engineer, Electric	2133
Engineer, Mechanical/HVAC/Thermal Design	2132
Engineering Technologist	2241
Environmental Consultant	4161
Environmental Technician and Technologist	2231
Information Systems Analysts	2171
Insurance Agents and Brokers	6231
Lawyers: Environmental Loan Officers, Energy & Technology	4112
Other Labourers in Processing, Manufacturing and Utilities	9619
Solar Installers and Technicians	7441
Roofers and Shinglers	7291
Sales, Marketing and Advertising Managers	0611
Technical Sales Specialist/Technical Products Specialists	6221

Adapted from: Green Jobs Profile: Working in the Green Economy, Sarnia Lambton Workforce Development Board, September 2011

With the rise in solar photovoltaic energy development that is currently being seen throughout Canada, occupations in the general utilities and manufacturing sectors related to solar development will be promoted as well. Directly related occupations in power generation and manufacturing in the solar industry are highlighted in Figure 8.

FIGURE 8: EMPLOYMENT RELATED TO GREEN TECHNOLOGY SERVICES CLUSTER

Solar Power Industry	Occupation	NOC
Power Generation and Supply	Electrical power line installer	7244
	Electrical power line repairer	7612
	Customer service representative	1453
	Electrical powerhouse repairs	7243
	Electrical substation repairs	7243
	Electrical relay repair	7243
	Electronic powerhouse repair	2241
	Electronic substation repair	2241
	Electronic relay repair	2241
	Supervisor of mechanics	7216
	Supervisor of installers	7212
	Supervisor of repairers	7212
	Electrical engineers	2133
	Control and valve installer	7352
	Control and valve repairer	7352
	Electrician	7243
	Manager of production	0912
	Manger of operations	0912
	Technical director	7212
Electrical Equipment Manufacturing Other Electrical Equipment Manufacturing	Electrical and electronic equipment assembler	9484
	Coil winder	9484
	Finisher	9487
	Electromechanical equipment assembler	1471
	Shipping/Receiving	1473
	Extruding and drawing machine setter	9411
	Extruding and drawing machine operator	9411

Source: Niagara Workforce Planning Board, 2009. Niagara Labour Market Plan.

Although these occupations can be directly impacted by the growth of the solar industry, the specific occupations highlighted by the workforce planning board in Sarnia-Lambton (Figure 7) will be used to understand the compatibility of southeast Alberta's workforce to solar development. This is largely because the occupational description used in Figure 7 is broader, and reasonably encompasses the categories highlighted in Figure 8.

3.2 Profile of the Workforce

3.2.1 Occupation Classification and Workforce Profile

The above information has provided an indication of the occupations involved in the solar industry and the following information will describe the compatibility of southeastern Alberta's current workforce attributes with the occupation needs of the solar industry.

To preface this discussion the workforce information obtained has been derived from two separate sources. Statistic Canada's 2006 census was used and provides information for the entire Southeastern Alberta EDA excluding the County of Forty Mile. Workforce data was also retrieved from the Province of Alberta's Office of Statistic and Information and provides workforce information for the Lethbridge-Medicine Hat region which covers the entire EDA and additional municipalities including the City of Lethbridge. The source of each data is cited below each table. This information is meant to provide an overview of the workforce in the region and although the information detailed covers slightly different geographical areas, it provides picture of the suitability of the regional workforce to solar industry development.

In general, the Province of Alberta's occupational profile is not well suited for solar industry development. Many of the occupations profiled in the solar photovoltaic occupational profile are experiencing below average enrolment and growth. This could be due in part to the lack of opportunity related to these occupations. With this being said, three of the more skilled and educated occupations related to solar development have been experiencing above average growth rates; these occupations are: electrical engineering, mechanical engineering and environmental technicians and technologists.

FIGURE 9: SOLAR PHOTOVOLTAIC OCCUPATIONAL PROFILE (ALBERTA)

Occupation	NOC	Growth Rate of Occupation
Business Development Officers/Rural Development	4163	Unavailable
Construction Inspectors	2264	Below Average
Construction Trades Helpers and Labourers	7611	Below Average
Contractors Supervisors/Other Construction Trades	7219	Below Average
Electrician	7241	Average
Energy Economist	4162	Unavailable
Engineer, Electric	2133	Above Average
Engineer, Mechanical/HVAC/Thermal Design	2132	Above Average
Engineering Technologist	2241	Average
Environmental Consultant	4161	Unavailable
Environmental Technician and Technologist	2231	Above Average
Information Systems Analysts	2171	Unavailable
Insurance Agents and Brokers	6231	Unavailable
Lawyers: Environmental Loan Officers, Energy & Technology	4112	Unavailable
Other Labourers in Processing, Manufacturing and Utilities	9619	Average
Solar Installers and Technicians	7441	Average
Roofers and Shinglers	7291	Below Average
Sales, Marketing and Advertising Managers	0611	Unavailable
Technical Sales Specialist/Technical Products Specialists	6221	Unavailable

Adapted from: Green Jobs Profile: Working in the Green Economy, Sarnia Lambton Workforce Development Board, September 2011 and Province of Alberta's Occupational Profiles, November 2011.

However, when focusing specifically on the available labour force in the southeastern Alberta region, the workforce is well suited for solar industry development. Over 23% of the total workforce is in occupations directly related to multiple points of the solar development including: project development, small and large-scale installation, manufacturing and power generation. In Figure 11, which represents the most current data available, this trend is similarly highlighted in the growth rates of occupations from 2004 to 2005. The most growth occurred in natural and applied science and related occupations which complements and supports the growth in the solar industry well.

FIGURE 10: OCCUPATIONS APPLICABLE TO SOLAR ENERGY (MEDICINE HAT CMA)

National Occupational Classifications Applicable to Solar Energy	Number of Workers	Percentage of Total Workforce
Finance and Insurance Administration Occupations	625	1.6
Professional Occupations in Natural and Applied Science	465	1.1
Technical Occupations Related to Natural and Applied Science	1195	3.0
Wholesale, technical, insurance, real estate sales specialists and retail, wholesalers	550	1.4
Contractors and supervisors in trades and transportation	485	1.2
Construction trades	1645	4.1
Stationary engineers, power station operators and electrical trades and telecommunications occupations	530	1.3
Machinists, metal forming, shaping and erecting occupations	690	1.7
Trades helpers, construction and transportation labourers and related occupations	860	2.2
Labourers in processing, manufacturing and utilities	1750	4.4
Judges, lawyers, psychologists, social workers, ministers of religion and policy and program officers	550	1.4
Total Workers Involved in Occupations Related to Solar Energy Development	9345	23.7

Source: Statistics Canada Profile of Labour Market Activity, Industry, Occupation, Education, Language of Work, Place of Work and Mode of Transportation for Census Metropolitan Areas and Census Agglomerations, 2006 Census.

FIGURE 11: CHANGE IN EMPLOYMENT BY OCCUPATIONAL GROUP FOR LETHBRIDGE-MEDICINE HAT ECONOMIC REGION

National Occupational Classification	2005 Employment	2004 Employment	% Change
Sales and Service Occupations	33.5	32.5	31.1%
Trades, transport and equipment operators and related occupations	23.7	22.2	6.8%
Business, finance and administrative occupations	19	15.3	24.2%
Occupations unique to primary industry	17	20.1	-15.4%
Management occupations	9.7	9	7.8%
Occupations in social science, education, government service and religion	9.3	8.5	9.4%
Occupations unique to processing, manufacturing and utilities	9	8.9	1.1%
Health occupations	7.9	7.1	11.3%
Natural and applied science and related occupations	6.2	3.9	59%
Occupations in art, culture, recreation and sport	2.2	2.8	-21.4%

Source: Statistics Canada, Labour Force Survey

Although these numbers paint a favourable picture of the workforce for solar industry development there are also signs of caution; in a 2009 Wage and Salary Survey undertaken by the Province of Alberta it can be seen that four of the top fifteen jobs with the highest vacancy rates in the Medicine Hat-Lethbridge region are directly related to solar industry development; these include: information systems analysts and consultants, civil engineering technologists and technicians, stationary engineers and auxiliary equipment operators and residential and commercial installers and servicers.

FIGURE 12: ALBERTA WAGE AND SALARY SURVEY: TOP 15 OCCUPATIONS IN LETHBRIDGE-MEDICINE HAT ECONOMIC REGION BY VACANCY RATE, 2009

No	NOC	Occupation (NOC)	Job Vacancy Rate
1	2225	Landscape and Horticulture Technicians and Specialists	24.7%
2	2171	Information Systems Analysts and Consultants	23.5%
3	3235	Other Technical Occupations in Therapy and Assessment	23.5%
4	0012	Senior Government Managers and Officials	19.7%
5	3152	Registered Nurses	18.6%
6	2231	Civil Engineering Technologists and Technicians	16.0%
7	7351	Stationary Engineers and Auxiliary Equipment Operators	15.1%
8	0016	Senior Managers - Goods Production, Utilities, Transport and Construction	11.5%
9	6681	Dry Cleaning and Laundry Occupations	10.4%
10	6212	Food Service Supervisors	10.3%
11	6242	Cooks	9.5%
12	8431	General Farm Workers	9.4%
13	7441	Residential and Commercial Installers and Servicers	9.2%
14	8612	Landscaping and Grounds Maintenance Labourers	9.2%
15	3142	Physiotherapists	8.6%

Source: 2009 Alberta Wage and Salary Survey.

3.2.2 Education and Training

Transitioning existing careers into green jobs often requires the completion of a degree, diploma or certification program. To provide incoming workers with relevant knowledge and experience, many colleges and universities are providing programs specifically tailored for work in the solar PV industry.

The above information presents a mixed picture of the compatibility of southeastern Alberta's workforce with the development of the solar industry. This section will highlight current programming options that are available that can provide workers with training in occupations that will allow the workforce to be amply educated and trained to support the needs of a growing solar energy industry.

3.2.2.1 Medicine Hat College

Medicine Hat College has a wide variety of programming available that can provide the local workforce with skills and aptitudes needed in the solar industry. These programs include:

- Welder

- Steamfitter/Pipefitter
- Power Engineering Technology
- Heavy Equipment Technician
- Computer Information Systems
- Electrician
- Engineering (including civil, mechanical, electrical and chemical).

4 Location Factor Assessment

Having defined larger trends in the global and national solar energy industry, as well as workforce opportunities and challenges, it is important for the southeast Alberta region to understand the location factors that are critical to supporting the development of a solar energy industry in the region. Understanding those factors will allow the communities in the southeast Alberta region to identify the assets and competitive advantages that need to be highlighted in an investment attraction campaign. It will also provide an understanding of the "gap" areas for the member communities, where efforts will need to be focused to generate a stronger value proposition in support of investment. Though the weighting applied to each location factor will be different on a company by company basis in the solar sector, there are several factors that most businesses will assess in a location decision regardless of their core activities and markets.

Generally speaking, there are 10 broad location factors that companies in most economic sectors will look at when considering location decisions. These factors are based on site selection worksheets developed for the Local Economies in Transition initiative completed by the Economic Developers Council of Ontario (EDCO) and a range of private sector partners in 2008.

- **Labour force**: population characteristics, employment/unemployment, availability of labour, labour management relations.
- **Local industry**: Largest employers, recent projects and new companies, presence of suppliers, existing research base.
- **Transportation and distribution**: Proximity to current/future markets, proximity to suppliers, proximity to major infrastructure (road, rail, air, water), 3rd party trucking availability.
- **Taxes**: Local/provincial/federal tax rates.
- **Utilities**: Availability and cost of electricity, natural gas, water/sewer, telecommunications.
- **Local business environment**: Economic development involvement, environmental policies, permitting costs, processing times, recent local development activity.
- **Property availability and cost**: Industrial/commercial building availability and cost, serviced industrial/commercial land availability and cost.
- **Incentives/Business support**: Business financing, provincial/local incentives, international resources, local chambers of commerce and business associations.
- **Education and training**: Elementary/secondary school performance rankings, community college/university/vocational college programs, local employment and training services.
- **Quality of life**: Health care, crime rates, recreation and culture, housing affordability, external perceptions.

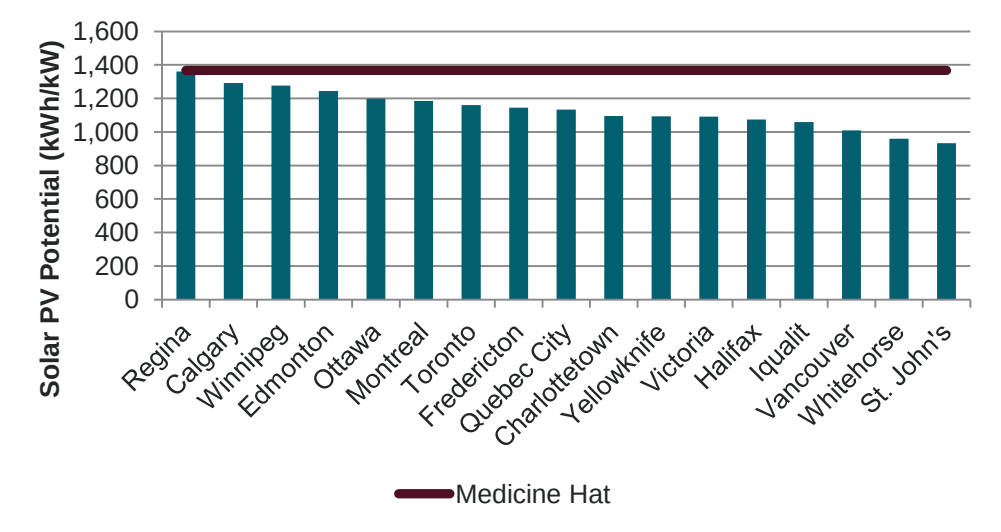
Success in investment attraction and marketing depends in part on finding the right balance between the strength of messaging, and identifying the assets and attributes that can genuinely deliver on that messaging.

The importance of each of these location factors will vary from sector to sector, and business to business. What forms a critical factor for investment in advanced manufacturing and solar production industries may have minimal impact on location and investment decisions for businesses focused on constructing, designing, and operating solar energy systems. Overemphasis of a factor which is less critical to a certain sector may overshadow the rest of the messaging meant to reach businesses in that sector. Thus it is important to narrow down the critical factors that will influence investment in solar energy, and understand the competitiveness of southeast Alberta in each of these areas. Overall, the location factors with the most influence on investment attraction in the solar energy sector include:

- Labour force.
- Local industry.
- Utilities.
- Incentives and business support.
- Education and training.

However, what is not caught in the assessment of location factors in southeast Alberta's primary advantage over competing jurisdictions – it's geographic location. southeast Alberta falls within the region of Canada with the highest potential for PV energy generation. When considering the thirteen solar "hotspots" identified by Canadian Forest Services (one for each of the 13 provinces and territories), Wild Horse, Alberta in the southeast Alberta region (1,373 kWh/kW) falls below only Regway, Saskatchewan (1,384 kWh/kW) for yearly PV potential. At 1,376 kWh/kW in annual solar PV potential, Medicine Hat fairs similarly well when considering the PV potential of Canadian capital cities, as illustrated in the figure below.

FIGURE 13: SOLAR PV POTENTIAL OF CANADA'S CAPITAL CITIES



Source: Derived from Natural Resources Canada, Canadian Forest Service, Photovoltaic municipal rankings in terms of yearly PV potential by Millier Dickinson Blais, 2011.

This high solar PV potential, as well as available land resources across southeast Alberta may prove to be the most critical factor for attracting investment in the solar energy sector. However, the full proposition to attract investment will rely on other factors beyond just location, as noted above. The strengths and weaknesses of southeast Alberta with regards to each of these additional factors will be outlined in the sections below.

4.1 Labour Force

Investment attraction in the solar energy sector requires that an area have access to workers with a wide range of skills, ranging from construction labourers and electricians, to lawyers, insurance agents, and information systems analysts. Though it is an asset if these workers are skilled in the solar energy sector, a good proportion of workers in traditional occupations will possess the skills to interact with the solar energy sector with minimal additional training needed.

In general, the labour force across Alberta is not well-suited for solar industry development, based on below average enrolment and growth in many of the construction-related occupations critical to solar industry success, such as electricians, contractors, construction trades and labourers, and roofers.

In contrast, the labour force across southeast Alberta seems well suited to solar energy sector development, based on the fact that over 23% of the region's workforce is engaged in occupations directly related to the solar energy sector, especially in project

management, installation, manufacturing, and power generation. With that being said though, southeast Alberta does face continuing challenges with regards to labour shortages. Many of the skills desired in the solar energy sector are also highly desired in other sectors of the economy, especially the oil and gas servicing sector. Thus many of the more critical labour force occupations needed to support the growth of the solar energy sector have high vacancy rates in the region. Some of the highest are found in knowledge-based occupations like information systems analysts, civil engineering technologists, and stationary engineers, but also occupations focused on installation and maintenance.

Overall, the labour force in southeast Alberta seems well positioned to assist with the growth of the solar sector, based on existing skills. However, the rapid economic growth of the province has historically created tight labour markets in a number of occupations that are important for solar industry development. This is especially relevant for skilled trades and construction labourers. The shortage has fuelled strong migration to the province over the last several decades, which has in part alleviated some of the concerns. However, the prospect of another labour shortage remains for Alberta based on the continued recovery and growth of the province's economy. Though the workers are available today, competing sectors may draw these potential employees away from solar energy in the future. In order to stay competitive, Alberta and the southeast Alberta region should consider workforce development as a priority, in order to ensure a sustainable supply of the skilled workers needed for the solar energy sector.

4.2 Local Industry

In part, the strength of local industry will play a role in solar energy investment attraction as suppliers, service providers, or customers. At present, the southeast Alberta region benefits from an emerging renewable energy sector primarily focused on wind energy. NaturEner Canada Wind Energy currently has approvals for two projects south of Medicine Hat: the Wild Rose 1 project, with an expected capacity of 204 MW and the Wild Rose 2 project, with an expected operating capacity of 162 MW[53]. Further, the region is home to the 120 MW Peace Butte project from Renovalia (although this project is presently experiencing delays), and the planned 775 MW Wild Steer Butte project proposed by Shell Canada[54]. In addition to this private sector demand and development, the City of Medicine hat has also expressed interest in setting up a smaller wind farm in the Box Springs area.

Local industry interest in solar energy has been more limited, and focused on small-scale projects. There are a small number of companies in the region focused on solar energy systems and components, including:

[53] NaturEner. (2011, Aug. 29). NaturEner receives green light on Wild Rose 2 power.

[54] Economic Development Alliance of Southeast Alberta. (2011). Wind Energy Development Opportunity Identification Report.

- Battery Direct, which offer a wide range of inverter charger solutions for renewable energy systems, as well as solar inverters. Battery Direct is Canada's industry leader in the design, manufacturing and sales of batteries and stored energy solutions. They are a Canadian distributor for a number of solar energy products designed to convert and store solar PV generated power.
- Globe Solar Energy Inc., which offers consulting, manufacturing, and installation of thermal solar systems. Their systems are distributed in Canada and US and are largely used for small scale domestic projects.
- TerrAlta is a renewable energy product provider and installer. They provide a variety of services, including solar PV systems that connect to the grid, connect to a battery, or completely independent off-grid systems. They also offer closed loop hot water systems for domestic and commercial use.
- Goosecreek Renewable Energy Inc., based in Blackie, Alberta, has been one of the key developers of small and large solar PV designs and installations in the South East Alberta area. They regularly partner with Canadian suppliers and are one of the leading alternative energy companies in the region.

One of Goose Creek's projects, the 30 kW "Ridge" project is the largest freestanding roof-mounted solar project west of Toronto. Further, one local company in Medicine Hat has proposed a solar demonstration plant on a 12 acre parcel adjacent to its operations. While the company has obtained approval from its parent company and formed partnerships with Medicine Hat College and other training partners, the project still requires government funding in order to proceed.

The only other larger-scale solar developments in the region have been undertaken by the City of Medicine Hat. As part of the Alberta Solar Showcase in 2006, the City installed a one kilowatt solar electric system on the roof of the City's library. At present, the City has proposed the Medicine Hat Solar Thermal Energy (M-HaSTE) pilot project, which would install and test a one MW concentrating solar thermal field in the city, to augment energy production at the City's utility plant. The project is currently under review for funding from higher levels of government. The City has also proposed the concentrating solar electric project, which would see installation of a five kW system on the roof of the Family Leisure Centre in the City.

Consultation Highlight:

"We have a number of large companies, such as Goodyear and Shell Canada, who would be excellent partners in the development of solar energy projects in the region."

Beyond solar energy, the City benefits from local industry concentrations that can assist with the development of a solar energy sector value chain. The southeast Alberta region has a stable manufacturing sector, employing over 1,600 people. Based on the strength of the province's oil and gas sector, a metal products and industrial machinery cluster has emerged throughout Alberta and southeast Alberta. The southeast Alberta and Palliser regions are particularly focused on machining, machinery manufacturing, and values, pumps, and other components. The industry concentration in machinery and metal working is an asset to the local solar energy industry. These firms and employees will have the skills necessary to assist with custom metal and component fabrication focused on the solar energy industry. Though southeast Alberta may not have the industry capability to manufacture solar systems or

arrays, the region has the capabilities to design and construct the metal and structural components that enable installation and operation of solar systems.

There is little existing support from private industry for the solar energy sector in southeast Alberta. However, there is industry support for the renewable energy sector in the region, paired with regional governments and public stakeholders committed to supporting renewable energy and solar investment. Further, the capabilities of the region with regards to metal fabrication offer strength to the industry's value chain, particularly in the design of structural systems and components for the installation of solar systems. While local industry support is limited, there is a strong foundation upon which to grow further industry support.

4.3 Utilities

When considering utilities as a location factor for investment attraction, the discussion is often focused on the availability and cost of electricity, gas, water, sewer, and telecommunications. Looking at the solar energy sector though, the discussion shifts to factors like capacity, control, and receptiveness. Similar to looking at the availability of utilities to support business activities, the solar industry sector considers the ability of the utility infrastructure to support solar energy generation.

Wholly-owned and operated by the City, the City of Medicine Hat Electric Utility has been providing primarily gas-powered energy to the city and surrounding communities (Redcliff, Dunmore, Veinerville and areas in the rural fringe around the city) since 1910. The existing rates for that electricity service are among the lowest in Alberta, and the reliability of the system is within the upper 25% of all municipal utility systems in Canada. The utility owns and operates the Medicine Hat power plant, and the electrical transmission and distribution systems, as well as radio and fibre communications systems to connect City departments.

Though the utility buys and sells electricity via a physical connection to the Alberta Transmission System, the utility is not part of the Alberta Interconnected Electrical System. As such, the utility has been unaffected by deregulation in the industry, which has affected customer choice and rights to electric generation. The City has developed its own microgeneration policies to govern the interconnection of electricity producers (less than five kW) to the City's electrical system. The process requires four steps, all of which are administered by the City utility, the planning department, and the safety codes inspection department. A net billing program, with credits for electricity produced, is used to compensate microgenerators.

By owning and operating its own generation, transmission, and distribution systems, the City maintains an element of control over its own energy prospects. Although the utility is still subject to provincial regulations, and any projects must seek provincial approval, this high level of local control is significant. From the perspective of a solar energy investor looking for a reliable connection through which to sell electricity, and a minimal amount of regulatory approvals to establish the connection, an independent

utility operation is an asset for a municipality. Though large-scale projects still need approvals from other agencies and levels of government (i.e. Alberta Utilities Commission), the streamlined local process is still an asset.

4.4 Incentives and Business Support

In many ways, the package of business incentives or support that a municipality can offer will be a critical element in attracting investment, particularly for slow growth or newly emerging sectors of investment. For a municipality targeting growth and investment in an area where there has traditionally been little activity, a strong package of incentives and business support programs may be the only factor that encourages growth of that sector. However, the options available to Canadian cities are quite limited with regards to financial incentives to generate investment. Where American cities differentiate themselves on the financial assistance they can offer to a company, Canadian cities must use more innovative approaches, often based on flexible policies, streamlined regulations, or payment rebates/deferrals to create attractive environments for investment. The federal and provincial governments are much more flexible with regards to financial incentives. For renewable energy, the federal government has introduced a range of programs focused on consumer and business rebates for energy retrofits and renewable energy equipment, as well as incentives for low-impact renewable energy generation. The most aggressive provincial incentives and programs are based on Ontario's *Green Energy Act,* which offers a range of financial incentives for renewable energy generation, construction, and manufacturing.

At present, there are no comparable programs in the province of Alberta focused on renewable energy or solar investment, except for rebates focused on residents that complete the federal ecoEnergy Retrofit program. The Hat Smart II program, administered by the City of Medicine Hat, provides those in the southeast Alberta area served by the Medicine Hat Electric Utility with incentives focused on solar energy installation. Residential customers can receive up to a $1,000 rebate from the City for purchased or leased solar electric or hot water systems, while commercial and industrial customers that pay taxes to the City of Medicine Hat are eligible for up to $5,000 in rebates from the City for the installation of solar electric or solar hot water systems.

For business support, the area benefits from the active involvement of the Economic Development Alliance of Southeast Alberta and the Palliser Economic Partnership in the renewable energy sector. Both organizations are actively pursuing the development of renewable energy in the southeast Alberta area, and have existing marketing, communications, and business support services that can be reoriented to focus on the support of the solar energy sector.

The solar-focused incentives available in the southeast Alberta region may play a key role in the expansion of solar energy generation in the region. However, the incentives are focused exclusively on installation. Other jurisdictions provide incentives that will allow for more on-going economic impacts based on solar energy installation, including

revenue generation opportunities for small and larger-scale producers and manufacturing and construction opportunities for businesses in the jurisdiction. Until a more formal provincial, or perhaps even local program is developed to offer more on-going benefits (beyond net metering), the southeast Alberta area will remain slightly behind some other Canadian jurisdictions in terms of encouraging the development of the solar energy sector; primarily Ontario.

4.5 Education and Training

One of the key elements to cluster development is having a readily available supply of local talent that can engage with businesses in the sector. Local education and training programs will enable the development of that local workforce, both through new entrants to the labour force and existing workers looking to access new employment opportunities.

Currently, there are dispersed training programs available across Canada. The Canadian Solar Industries Association offers programming focused on the installation of solar PV and thermal systems across Canada, and detailed training programs for Solar PV delivered out of Seneca College in Ontario. Other solar energy-focused programming is offered at a number of institutions across Canada, such as:

- British Columbia Institute of Technology (BCIT)
- Cambrian College (Ontario)
- Centennial College (Ontario)
- Humber College (Ontario)
- Lakeland College (Alberta)
- St. Lawrence College (Ontario)
- Canadian College of Health Science and Technology (Ontario)
- St. Clair College (Ontario)
- New Brunswick Community College Moncton

Southeast Alberta presently benefits from a range of new educational and training programs focused on developing workers in the renewable energy sector. Adjacent to the EDA region, the International Wind Energy Academy (IWEA) at Lethbridge College is focused on expanding the role of Southern Alberta in wind and solar energy generation, technology, and expertise. The 32-week Wind Turbine Technician certification program offers students the skills to diagnose and maintain mechanical and electrical wind turbine equipment with practical instruction on a training tower on the Lethbridge College campus. The instructional program is based on that of the BZEE Training Centre for Renewable Energy in Husum, Germany, which allows students to gain an internationally-recognized and ISO-standard level of certification in wind energy technology. The IWEA is currently looking to create similar programming focused on solar energy.

There are no solar energy-focused training resources available locally or regionally in southeast Alberta. Medicine Hat College offers an excellent trades program focused on

educating electricians, plumbers, steamfitters, and welders; all of which offer skills applicable to the solar energy sector. Other programming focused on power engineering, heavy equipment, computer information systems, and engineering also offer skills which transfer to the solar industry. The College has recognized the need for local trades programs to reflect local needs, and as a result two of their instructors have attended training workshops sponsored by CanSIA, the national research and advocacy organization for solar power and are working with local companies to establish a training program in solar residential and commercial applications for 2011 that includes demonstration facilities.

Overall, there has been extensive interest in the development of renewable energy systems design and construction training programs throughout Canada. At present, the southeast Alberta area lacks dedicated training and education resources focused on the sector, which places it behind a number of other jurisdictions across Canada. With that being said, the strong profile of non-solar trades and technology programs offered by institutions in south and southeast Alberta provide the region with a solid base of technical programming on which solar-focused programs could be built. Further, the existing programming does provide skills that are transferrable to the solar energy sector.

5 Regional Assets and Opportunities

5.1 Value Proposition

The preceding research suggests that southeast Alberta has a limited number of factors that have the potential to appeal to investors and businesses in the solar PV sector. There are few industry players currently involved in the area, and there is an absence of renewable energy incentives available at the Provincial level to encourage industry development. This is not to say, however, that there are not key advantages southeast Alberta can leverage and utilize to develop and attract solar investment. The sector requires a tailored value proposition that captures the primary strengths of the region for solar development: energy output potential and the independence of the region's energy utility. These are the competitive advantages that southeast Alberta must emphasize in order to differentiate itself from major competitors such as the province of Ontario.

In considering this value proposition, it is important to understand what factors are critical for supporting investment and location decisions in the target sector. Understanding the location factors that are important will allow southeast Alberta to identify its assets and competitive advantage to attract and encourage activities in the solar PV sector. The solar PV industry requires specific resources to be successful, which differentiates it from traditional business sectors such as finance and insurance or others, as it requires the specific availability of a resource. Building on the elements of the previous section, the value proposition for southeast Alberta should rely on the following factors:

- Labour force.
- Local industry.
- Education and training.
- Resource availability

The manner in which of each of these factors contributes to an overall value proposition for southeast Alberta in the solar energy sector are outlined below.

Labour Force

Generally, The Province of Alberta's labour profile is ill-suited to Solar PV industry development. However, southeast Alberta has:

- Over 23% of its total workforce employed in occupations directly related to multiple points of the solar development including: project development, small and large-scale installation, manufacturing and power generation.
- Growing provincial workforce in key skills areas: electrical engineering, mechanical engineering and environmental technologists or technicians.

These occupations are also sought after by the oil and gas industry, and the province often experiences labour shortages that are alleviated by provincial immigration. As a result, the region's housing affordability and lifestyle offerings should be considered in the branding for this sector.

Local Industry

In some sectors, companies and investors deliberately seek to place themselves at the centre of a "cluster" of industries operating in a similar space. This allows greater opportunities to create partnerships and joint ventures, leverage external research results, and reap the benefits of business-to-business networking in a tightly-linked industry. Overall, there is the foundation for a cluster of solar and renewable energy in southeast Alberta. The current factors contributing to this include:

- A growing base of existing companies in the sector, often demonstrating high levels of entrepreneurial energy and innovation.
- An emerging cluster of businesses and researchers seeking to link to existing strengths such as the oil and gas industry by developing solar PV systems that create more efficient and low cost oil and gas systems.
- A well-established, independent utility which is able to provide streamlined access to the power grid and able to determine its own microgeneration policies.
- A number of pilot projects in the renewable energy field and a commitment from local industry and government to develop additional solar PV trials.

Education and Training

The sector-related education, training and research programs available within southeast Alberta form the key element of the region's value proposition in the labour force area.

Medicine Hat College has a wide variety of programming available that can provide the local workforce with skills and aptitudes needed in the solar industry. The College is also working to develop a program specific to solar PV which will include the development of demonstration solar PV systems to be used for training purposes. This current strength, and openness to adapting to the needs of local industry, should be highlighted. Several stakeholders noted the College's interest in being a leader in solar PV research and development, as well as an education and training provider for the sector. The College has recently established an Office of Research and Scholarship to establish the College's capacity in this area.

Resource Availability

In many ways, the location of southeast Alberta is its primary strength for attracting solar energy investment. All marketing materials and activities should seek to highlight one critical point:

- Southeast Alberta and Medicine Hat have one of the highest potential outputs in North America for solar PV generation, at 1376kWh/kW annually.

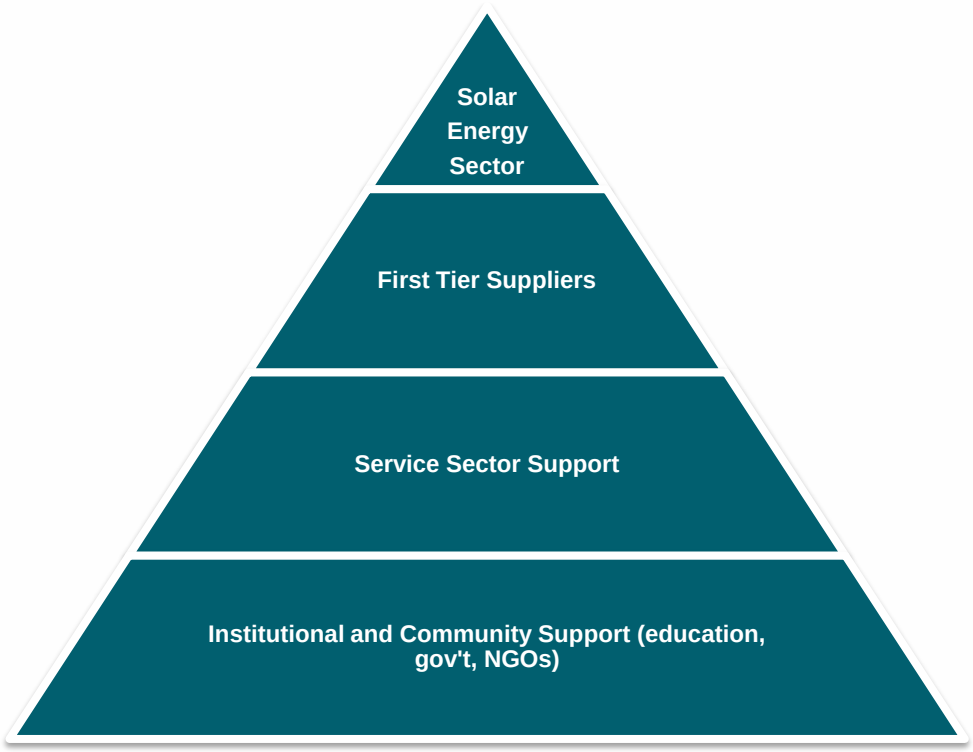
While work remains in teasing out the nuances of this value proposition, this provides a general overview of the key elements of southeast Alberta's competitive case. From an existing base of assets within the community, the value proposition identifies those which are most compelling to potential investors and actors within the target sector. In the next section of this report, the broad network of support businesses and organizations for the solar energy sector are outlined, with the intention of providing a targeted list of the "suppliers" that this value proposition can be articulated to.

5.2 Value Chain Assessment

The development of a strategy to attract investment and develop a local sector of activity is not merely an exercise in identifying areas of strength. It is a more nuanced approach attempting to articulate key core messages about how the current configuration of the sector may be deployed and supported to drive economic growth and increased employment. It is about identifying the specific reasons why an existing local business, new entrepreneur, or external business investor would choose to invest or reinvest in an economy.

In the previous section, the set of location factors that can act as an asset in support of solar energy investment were outlined. This section outlines further the broader network of industry, institutional, and community support that is needed to encourage the development of the solar energy sector. Millier Dickinson Blais uses a pyramid model to visualize the broader network of support needed to support the growth of a fully-functioning, innovative, and adaptive industrial sector.

FIGURE 14: SOLAR ENERGY PYRAMID OF SUPPORT



The top of the pyramid is populated by the companies and organizations that operate in the most visible areas of the solar energy sector; perhaps the company or individual that owns and operates the solar energy system for example. The next layer of support is composed of first-tier suppliers, or those companies that supply the immediate inputs to the companies and organizations in the targeted area. Typically, this layer contains any manufacturing or preliminary processing industries, as well as any construction activities. The subsequent layer is composed of companies and organizations that provide the services required by businesses and organizations in the target sector, such as financial and professional services, or sales and distribution. The final layer of the pyramid is composed of the broader institutional and community-based support organizations that service companies and organizations in the target sector.

To understand the lower levels of the pyramid, and the types of companies and organizations that will ultimately support the development of each target cluster, Millier Dickinson Blais employs a value chain assessment using a methodology developed by Dr. Edward Feser at the University of Illinois at Urbana-Champaign (UIUC). In the course of his work on regional economic analysis and supply chains, Dr. Feser has done detailed analysis on national level US statistical data related to input/output of sales, in order to develop a measurement of the relative strength of inter-industry linkages. Feser's work shows the connection between 'Core' and 'Linked' Industries. The average propagation length (APL) is used to note the strength of the industry

connection, both forwards (linked industries that 'purchase' from the core industry), and backwards (linked industries that 'supply' the core industry). Generally speaking, the average propagation length is the average number of steps or time it takes a stimulus in one industry to propagate and affect another industry[55]. The lower the APL value, the tighter the linkage between a specific industry and the core industry. The relationship is noted by the figure below.

FIGURE 15: CONCEPTUAL DIAGRAM OF INDUSTRY LINKAGES

For the southeast Alberta region, this analysis offers a unique way of exploring the broadest set of businesses, agencies, and organizations that can support activity across the solar energy sector. The figure below outlines the composition of the pyramid of support for the solar energy sector.

[55] Dietzenbacher, E. and Romero, I.. (2007). Production Chains in an Interregional Framework: Identification by Means of Average Propagation Lengths. International Regional Sciences Review.

FIGURE 16: PYRAMID OF SUPPORT INDUSTRIES AND ORGANIZATIONS, SOLAR ENERGY SECTOR

Pyramid Level	Notable Industry Subsectors and Organizations
First Tier Suppliers	■ Oil and gas extraction ■ Residential and non-residential construction ■ Utility systems construction ■ Land subdivision ■ Heavy and civil engineering construction ■ Foundation, structure and building exterior contractors ■ Building finishing contractors ■ Specialty trade contractors ■ Glass and glass product manufacturing ■ Forging and stamping ■ Architectural and structural metals manufacturing ■ Machine shops, turned product, and screw, nut and bolt manufacturing ■ Ventilation, heating, air-conditioning and commercial refrigeration equipment manufacturing ■ Metalworking machinery manufacturing ■ Engine, turbine and power transmission equipment manufacturing ■ Semiconductor and other electronic component manufacturing ■ Navigational, measuring, medical and control instruments manufacturing ■ Electric lighting equipment manufacturing ■ Electrical equipment manufacturing
Service sector Support	■ Air transportation ■ Rail transportation ■ Deep sea, coastal and inland water transportation ■ Telecommunications ■ Information services ■ Data processing services ■ Securities and commodity contracts intermediation and brokerage ■ Insurance carriers ■ Pension funds ■ Lessors of real estate ■ Offices of real estate agents and brokers ■ Legal services ■ Accounting, tax preparation, bookkeeping and payroll services ■ Architectural, engineering and related services ■ Specialized design services ■ Computer systems design and related services ■ Management, scientific and technical consulting services ■ Scientific research and development services

	■ Advertising, public relations, and related services ■ Employment services ■ Electronic and precision equipment repair and maintenance
Institutional and Community Support	■ Community colleges ■ Universities ■ Grant making and giving services ■ Social advocacy organizations ■ Civic and social organizations ■ Business, professional, labour and other membership organizations

The analysis provides a strong framework upon which to build investment attraction initiatives in the solar energy sector. In particular, the analysis provides a means of targeting lead generation and investment retention and expansion efforts on industries that have a strong link to businesses and organizations within the solar energy sector.

The list of targeted support industries allows for a NAICS-based approach to lead generation and investment targeting. A number of third-party business directories, such as Hoover's or Scott's, categorize companies from across North America and the world based on standard industrial classifications like NAICS and Standard Industrial Classification (SIC) codes. The industries and organizations outlined in the pyramid of support above offer a discrete set of codes that can be cross-referenced with third-party data sources to refine the wider list of potential targets to a discrete list of companies in sectors that have proven value chain linkages to solar energy sector activity. The approach can be used in a similar fashion with databases organized by International Standard Industrial Classification (ISIC) codes, in target markets outside of North America.

These high-priority companies can then be qualified further by determining which have the highest potential to expand or invest in southeast Alberta. This is typically done through research methods ranging from detailed corporate intelligence activities and collection of data on company intentions, to the identification of target companies in the value chain on the various sector- and growth-based lists published by companies across the globe, like Deloitte, the Branham Group, and Inc. Magazine.

Whatever the methods chosen to identify and pursue leads, the value chain and pyramid of support exercise above provides southeast Alberta with a list of industry subsectors that can further support the growth of the solar energy sector in the region.

5.3 Strategic Direction

In examining southeast Alberta's competitive advantage in the solar energy industry, Millier Dickinson Blais has outlined that there are a number of foundational elements in the region that may contribute to the development of the solar energy sector. In order

to further build the industry across southeast Alberta, a model based on the economic development notion of "cluster development" is appropriate. Cluster development is the idea that businesses group together in nodes of concentration and that these nodes arise where resources are "thickest" – that is, where concentrations of talent, infrastructure, financial capital, etc. are present and available to participants within the cluster.

Economic development practitioners have long embraced the concept of cluster development as a key component of their strategic activities. Introduced by Harvard University's Michael Porter, cluster theory describes the interactions of concentrations of interconnected businesses, suppliers and associated institutions within particular areas of business and industry. Clusters can be defined in four ways:

- Geographically (i.e. interactions within a specific region)
- Horizontally (i.e. interactions between businesses to share resources)
- Vertically (i.e. interactions based on supply chain management)
- Sectorally (i.e. interactions between businesses in a given business field)

Initially, the term "cluster" was applied only to large and significantly resourced industry concentrations, particularly world-renowned locations such as Silicon Valley for ICT or Zurich for pharmaceuticals. More recently, economic development practitioners have taken to employing the concept in a less grand sense, and more as a "short hand" for explaining the potential to grow local economies by building on areas of concentration and interconnectedness within their own community. In addition, economic development practitioners want to foster growth by nurturing an entrepreneurial and innovative business environment. This interconnected and entrepreneurial environment creates a "thickness" of opportunities as it is supported by human and financial capital.

Most communities have several business sectors where this "thickness" is particularly evident, where a concentration of business ventures, community organizations and institutional structures overlap in areas of focus and expertise. These are often referred to as areas of local competitive advantage and form the basis of strategic targeting exercises in economic development activity. From this perspective, each time an additional cluster is identified, the community's competitive advantage or value proposition for a certain segment of potential investors is strengthened. However, industry sector clusters in and of themselves may not be sufficient to differentiate the local economy or to provide an area of competitive advantage for communities in their economic development efforts. The key question then becomes:

- How can southeast Alberta differentiate itself from competitors and – over time – begin to enhance its competitive advantage over other communities?

Although southeast Alberta has created pilot projects and other small-scale incentives and programs to jump start the solar energy industry there is limited "thickness" in the area's resources to promote the solar industry. There is a lack of supportive policy infrastructure in place, particularly from the provincial level, to promote any additional growth in renewable energy production. The value proposition is relatively weak and the points of contact with the larger supply chain are minimal. Although, this is an initial

setback to the development of the industry it also provides the Southeast Alberta Economic Development Authority with the advantage of becoming an innovator and driver of the industry in the present and future.

What Millier Dickinson Blais proposes is a multi-step, sequential strategy for creating the necessary conditions for further development in the solar sector. This strategy consists of three components:

- **Strategic Industry Development Phase 1: Build on Existing Assets/Strategies -** By continuing to invest in local utility infrastructure, programming and pilot projects southeast Alberta can create a welcoming climate from future development
- **Strategic Industry Development Phase 2: Cluster Promotion and Marketing** - When sufficient time and energy have been devoted to creating a supportive climate for the solar industry, investment attraction and marketing will be crucial to the development of a solar industry cluster.
- **Strategic Industry Development Phase 3: Hub Creation –** Once the local industry has matured the longer term vision for the area is to become the hub of the solar energy industry for the Province of Alberta.

5.3.1 Phase 1: Build on Existing Assets/Strategies

Phase one of the three phase strategy seeks to highlight and build upon the work already being conducted by southeast Alberta, the City of Medicine Hat Utility and key local businesses in developing a solar industry. Building upon the successes already undertaken will create continued and sustained growth and synergy in the solar industry and increase the competitiveness of southeast Alberta to attract new solar investment.

Millier Dickinson Blais proposes a three-pronged approach to further developing southeast Alberta's competitive advantages in the solar industry, these include:

- Further Development of Pilot Projects
- Investment in Smart Grid Technology
- Establishing Local Support Mechanisms

5.3.1.1 Build Pilot Projects

Building upon innovative pilot projects already in existence, southeast Alberta should continue to support the creation of a variety of pilot projects throughout the region in order to incubate the local solar industry, and develop a reputation as a showcase for solar industry innovation. The pilot projects currently underway are excellent examples of projects that bolster the area’s solar contractors as well as promote and educate the population about the solar industry. By investing in pilot projects throughout the Southeast Alberta EDA region, and working to forge relationships with local solar contractors, the City of Medicine Hat Utility and other interested bodies, southeast

Alberta can continue to foster and develop a positive climate for solar investment for small-scale and large scale producers and installers.

Additionally, pilot projects can be used to attract the attention of interested investors and create an innovative and dynamic climate for technological advancement and entrepreneurship. These pilot projects can and should be used in phase two as a powerful tool for marketing and business attraction.

5.3.1.2 Invest in Smart Grid Technology

In conjunction with supporting pilot project development, southeast Alberta should engage with the City of Medicine Hat Utility to develop a comprehensive strategy to work towards developing smart grid approaches (as seen in the best practice of Summerside, Prince Edward Island), and to create the ability to monitor, incentivize and promote the development of roof-top solar PV units in both residential and commercial capacities.

Smart electrical grids attempt to predict and respond to the behaviours and actions of all components of the grid, including electrical supply and consumer demand. In general they can promote greater interest in feed-in programming and make it possible for customers to reap the benefits of conservation and solar panel installation by calculating usage and the amount of power generated by roof-top installations connected to the grid. By investing in smart grid technology throughout southeast Alberta, the more sophisticated infrastructure can help to attract new solar investment in the area.

5.3.1.3 Establish Local Support Mechanisms

Southeast Alberta will play an instrumental role in creating local support mechanisms for the growth and establishment of the solar energy industry. These could include a variety of local initiatives including:

- Workforce planning related activities that ensure that the workforce by to the solar industry is readily available.
- Land use studies to ensure land use policies allow for the development of small and large-scale solar projects throughout the area.
- Creation of incentive programs that will attract and promote the solar industry in the area. These incentive programs can range from up-front rebates to off-set installation costs, to feed-in tariffs paid to solar developments for the energy sold to the utility. Both of these incentives have worked well in other jurisdictions to bolster renewable energy development.

It is important that policy create favourable conditions for the development of the solar industry so that local solar firms can both grow and innovate, and that new investment is enticed to the area. By carrying out routine business retention activities and workforce development training, the EDA can further develop the necessary local

support mechanisms needed to develop the solar industry. Partnering with Medicine Hat College and working with their program development office can ensure that the proper programming is available to assist in the development of the labour force in specialties related to the solar industry. Similarly, the City of Medicine Hat Utility is an enormous asset to the success and creation of these policies. They should be full participants at every level of policy planning, to ensure that the necessary infrastructure is in place to provide support for future solar development initiatives.

By developing additional pilot projects, investing in energy infrastructure like smart grid technology, and creating policies that help to create competitive advantages in the region, southeast Alberta can lay the foundation for creating a solar energy hub in Alberta.

5.3.2 Phase 2: Investment Attraction

Phase one provides the key assets and successes that can create a competitive environment for solar investment and act as key touchstones that phase two can begin to market in order to attract investment. At this point in the strategy it is important that southeast Alberta successfully brand the region as a leader of innovative and solar energy development. The EDA must cement the role of southeast Alberta as a demonstration site and hub for pilot project, while giving local solar entrepreneurs a competitive advantage for growth and expansion outside of the community. The message should affirm that the area has developed the necessary support mechanisms to bolster solar business development. Key players should be targeted and relationships should be developed throughout the solar industry value chain presented in the previous section.

Consultation Highlight:

"People, both consumers and investors, are not aware of southeast Alberta's solar energy potential. They need to know that solar is a natural fit here, that we are a solar hotspot."

In this phase, the EDA should actively market and promote the assets and successes developed during phase one of this strategy to potential small-scale investors. This marketing can be done in a variety of ways, including:

- Creation of web content and hard copy marketing materials to provide information about the region to potential investors
- Attendance at various solar industry tradeshows.
- Development of relationships with key businesses in the industry.

Attracting business throughout the value chain remains vital to the development of a strong cluster of solar related activities. Southeast Alberta can highlight the strengths already seen in the workforce to enforce the area's competitive advantage related to technical and manufacturing know-how.

One way in which southeast Alberta can begin to incentivize the diversification of the solar industry in the area is to create rebates and cost-sharing initiatives that encourage the use of available local inputs into future solar developments. This creates a financial incentive to sourcing available local materials and services, and can fuel further diversification in the industry. Before this policy is implemented some level of diversification is needed so it is important that southeast Alberta continually monitor

and keep track of the related companies in the region to ensure that it has an adequate profile of product and service providers.

5.3.3 Phase 3: Long-Term Vision

After a period of fifteen to twenty years the local assets and advantages garnered by phase one and phase two of this strategy will become entrenched in the region and southeast Alberta can become the centre for solar development in the Province of Alberta. It is hoped that the region will become a hub of solar energy innovation and development not only because of its strategic geographic position and potential solar output, but also due to its highly skilled labour force, forward-looking policy initiatives, and innovative infrastructure that works to incentivize and efficiently utilize renewable energy.

To continue to grow and attract investment, southeast Alberta should become a hub for the solar industry throughout the Province of Alberta. To begin to fully take advantage of this position the EDA should look to forge partnerships throughout the Province to bolster solar research and innovation throughout the area. A "hub and spoke" model of economic development is a useful framework to begin to develop a clearer understanding of the potential future position of southeast Alberta related to the solar industry.

Consultation Highlight:

"We lack a profile… we need to attract conferences on solar energy, bring them here, and use this type of event to showcase the possibilities."

Generally speaking, southeast Alberta can become a "hub" of economic activity and development related to the solar industry by creating partnerships with other communities and organizations that can provide research and development expertise, manufacturing expertise and other industry supports to southeast Alberta. The relationships formed with these organizations and communities at the end of the "spokes" can connect southeast Alberta to a wide variety of research institutions, companies and communities throughout Alberta and the rest of the world, which can continue to increase the profile of southeast Alberta in the industry. There are a number of provincial-level entities in the solar industry that would be useful to create partnerships with over the shorter term though, including:

The Solar Energy Society of Alberta: Located in Edmonton works to advance understanding and use of solar energy and other renewable energy throughout Alberta. SESA is a non-profit educational organization that holds seminars, workshops, classes, exhibits and public demonstrations and provides a solar technology demonstration trailer for public events.

In terms of assisting southeast Alberta in continuing to be a leader in the solar industry, SESA can provide up-to-date industry information, industry contacts within the province, and valuable insight into best practices and innovative policies to position southeast Alberta as a leader in solar development.

University of Calgary: World-class solar energy research is currently being undertaken at the University of Calgary and the University has proven that it is committed and engaged in the discussion around solar development. University of

Calgary professor and Canadian Research Chair Curtis Berliguette is developing ways in which to cost-effectively capture the sun's energy. Professor Berliguette heads the Centre for Advanced Solar Materials and is leading the way in developing state-of-the-art ultra-efficient solar cells.

Also at the University of Calgary, the Institute of Sustainable Energy, Environment and the Economy develops interdisciplinary approaches to inform investment and policy decisions by industry and government in sustainable energy systems. Partnering and developing relationships within the Institute can provide southeast Alberta with cutting edge information and expertise, and provide opportunities to build their reputation as a showcase for solar development in western Canada.

University of Alberta: Similar to the work being done at the University of Calgary by Berliguette, Chemistry professors at the University of Alberta are undertaking significant research into developing more cost-effective, plastic-based solar cells. These plastic solar cells are extremely lightweight, durable, inexpensive and convenient. Dr. Jillian Bruiak, the lead researcher on this project, and a group of PhD. students are working diligently to commercialize this material and hope to bring these products to market by 2015.

The research being conducted at both the University of Calgary and the University of Alberta have the potential to dramatically change the cost-effectiveness and trajectory of the solar industry. By partnering with these researchers and projects southeast Alberta can become a showcase of new and innovative technologies and cutting-edge research.

Northern Alberta Institute of Technology (NAIT): In May 2009, the federal government invested $6.8 million dollars for projects at NAIT, including the development of the Alternative Energy Centre. The Centre provides space for co-op research with industry and universities. it will provide new opportunities for students to study leading edge technology, and the alternative energy produced will help meet the power needs of NAIT's main campus. The Government of Alberta matched the federal funding and provided $2.6 million dollars to the Centre.

Southeast Alberta and Medicine Hat College should develop relationships with the NAIT, and look to develop similar programming for students in Medicine Hat. Funding opportunities should also be pursued, understanding that both the provincial and federal government are interested in funding similar programs in Alberta. Developing showcase solar installations at Medicine Hat College through public-private partnerships and other funding mechanisms can also be a way of promoting solar industry development, while highlighting the broader community's commitment and dedication to solar development.

The City of Lethbridge: The City of Lethbridge is part of the innovative Alberta Solar Showcase, which the City of Medicine Hat is leading. Partnering with a local builder and Lethbridge College, the city constructed a house that showcases practical, environmental technologies. The City of Lethbridge has also developed a Community

Sustainability Plan further underlining their commitment to sustainable energy and conservation.

Through partnering with the City of Lethbridge and working together with other municipalities and cities outside the Alliance, southeast Alberta can continue to develop a regional solar centre of which they are the hub. Different avenues of funding could be made available through different partnerships with multiple organizations and the creation of solid working relationships and similar policies promotes business attraction and future development.

By understanding that partnerships and alliances can bring new and innovative technologies and ideas to southeast Alberta, and continue to propel the regional solar industry into the future, southeast Alberta can ensure that their long-term vision of becoming a centre for solar development in the province is actualized. Over the longer term growth and strengthening of the local solar industry, southeast Alberta can broaden its focus for partnerships outwards, to institutions and organizations from across the world. In that sense, southeast Alberta becomes the “hub” for the dissemination of technologies and research from across the world to the rest of Alberta and Canada.

6 Investment Attraction Strategy

6.1 Understanding Marketing Strategy

In general terms, a “marketing strategy” is the particular vision or expression of strategic direction that serves to underpin a firm or an organization’s efforts to maintain and expand market share. In the economic development context, the concept is usually applied to the notion of an external communications, advertising and promotion plan focused on increasing a community or region’s “market share” of new investment. However, these basic understandings do not adequately address the significant variation in theory and approach between traditional private sector marketing strategies, and those employed within the economic development context to attract investment.

Most approaches to marketing strategy have been developed in the context of the private sector, where typical strategy structures include:

- Market Dominance Strategies, which focus on a company’s position as a leader, challenger, follower or niche actor
- Innovation Strategies, which focus on a firm’s relative ability to alter market conditions through new technologies, products, techniques or services
- Growth Strategies, which seek to define opportunities for market expansion related to choices between horizontal integration, vertical integration, diversification and intensification

To a significant extent, these models are only weakly connected to the strategic marketing needs of public and not-for-profit players in the economic development space. In part, this reflects traditional marketing’s focus on what is known as the “four P’s”, a term first coined in 1960 by E. Jerome McCarthy of Michigan State University. He suggested that traditional marketing approaches were built around “product”, but that effective marketing strategies should could be based on any one of (or any combination of) four key elements:

- Product
- Price
- Place
- Promotion

By expanding beyond the traditional “product” focus of the private sector, McCarthy laid the groundwork for marketing strategies within other spaces, including the economic development arena. While the four P’s concept was simplistic, it provided a shorthand that allowed those interested in investment attraction to begin to think in tactical terms about marketing directions, a process that reached its culmination in 1980 with the publication of Michael Porter’s seminal work, *Competitive Strategy: Techniques for Analysing Industries and Competitors*.

Porter's work has become a foundation piece for modern economic development, though often with only a superficial understanding of its content. In his work, Porter suggests that marketing strategies may be focused in one of three directions:

- **Cost Leadership Strategy** (defined as a "broad" strategy) – building market share by creating the lowest cost option in the marketplace. In economic development terms, this approach emphasizes attraction factors such as low taxation, low land costs, low regulatory hurdles, etc.
- **Differentiation Strategy** (defined as a "broad" strategy) – building market share by de-emphasizing cost factors, and instead suggesting that potential customers/investors cannot access what they need from other sources or in other jurisdictions. In economic development terms, this approach emphasizes unique or near-unique resources and assets (access to required raw materials, for example) within a community that will dictate an investor's location decision in a global context.
- **Segmentation Strategy** (defined as a "narrow" strategy) – building market share by recognizing that the community's value proposition is neither lowest cost nor most unique. Instead, this approach emphasizes the targeting of specialized industry niches, and works through the development and maintenance of relationships, specialized knowledge and customized support structures.

In the case of southeast Alberta's solar energy investment attraction efforts, it is this latter approach that is most appropriate from a marketing strategy perspective. While attractive in many respects, southeast Alberta is not the lowest cost jurisdiction seeking investment in this target sector. Similarly, while southeast Alberta has assets to anchor investment from within the solar sector, it is not sufficiently "differentiated" from a range of other North American jurisdictions to suggest that firms "must" locate to the region. Instead, southeast Alberta needs to focus on a segmentation strategy. Porter suggests that Cost Leadership and Differentiation strategies are "broad", by which he means they market to large – often global – audiences and targets. Segmentation emphasizes a "narrow" and targeted focus, which makes them much more focused, tangible and practical.

In essence, a segmentation approach aligns well with the opportunities identified and outlined in this report. While all investment is welcome, southeast Alberta is exploring a strategic economic development process which has identified the solar sector as an area in which it is well-positioned to support and attract new investment and growth. To pursue these opportunities, the region must intensively focus its efforts on this segmented target, creating relationships, expertise, capacity, networks, support structures, academic linkages and a range of other specialized segment-serving instruments and programs.

In this light, the solar sector represents and identified niche target area, which should be addressed through marketing and investment attraction activities that build upon three key pillars:

- Linking local assets in the target area to support marketing efforts – existing assets in the solar energy sector in southeast Alberta must be inventoried, and key

players gathered in advisory structures that direct and support efforts on an ongoing basis

- Building and communicating specialized knowledge of the segment – southeast Alberta must develop specialized marketing materials speaking to needs and opportunities within the solar sector, and make these available through dedicated (possibly standalone) aspects of its web presence, with summary materials in print form for supporting direct contact in the market
- Relationship building within the segment – to underline the direct interest and connection to the solar industry, southeast Alberta must develop direct links and contacts to the industry in its own space and an its own events, and maintain that contact over time

6.2 Southeast Alberta's Solar Attraction Strategy

To successfully engage and attract investors and investment from the solar sector, the Economic Development Alliance of Southeast Alberta will need to dedicate a portion of its existing staff resources to develop and deliver marketing efforts over time. While the initial commitment in this sector is relatively small – perhaps 15% of an economic development officer's time – this will likely grow as the sector expands and as opportunities become more significant.

In addition to overseeing and coordinating FDI and other sector investment attraction efforts, this individual will be required to implement marketing initiatives in the FDI context. This work will include administering dedicated marketing resources within future economic development budgets, raising further funds for FDI activities from local and regional partners and from senior levels of government, and delivering a robust sector marketing program. This individual will also work to build relationships with key international business intermediaries, create and deliver a range of marketing materials and messages, attend a variety of tradeshows and facilitate site visits and visiting trade delegations.

While action on the FDI attraction front will require these resources, it will be equally important to identify tangible metrics and performance measures associated with this role and expenditure. In essence, the EDA must be able to demonstrate a "return on investment" if the program is to be continued in the longer run. Initially, however, these metrics may be "softer" in nature, gaining detail and specificity as the sector grows. Possible initial metrics could include:

- Number of requests for information about local solar programs and investment opportunities
- Number of solar-related projects in the community
- Number of people participating in local solar sector events

While no one metric will capture all the elements of the region's efforts or performance on the solar front, the collection of such data will form a basis for future reporting, and may be used to promote the EDA's efforts in this arena to the broader community.

Building from this basic starting point, assets, the EDA must focus its marketing resources on developing content in its efforts to target international and external investors. This includes:

- Establishment of a Solar Sector Investment Attraction Website with Supporting Social Media Channels - Investment attraction websites are devoted to communicating specialized information and value propositions to target sectors and international markets. By developing a solar-specific web presence focused on the southeast Alberta region – separate from the EDA's main site – the region's value proposition and business case may be directly presented to potential investors.
- Development of Print Support Materials - Drawing on the content of the dedicated solar website, the EDA should develop short (two to four pages), visually-oriented print materials echoing the key messages of the website. While print is in many ways limited in its impact, this material serves as a "calling card" to support networking and relationship-building and demonstrates southeast Alberta's commitment to solar sector investment. This material should be developed in digital "print on demand" format to minimize cost, allow high levels of flexibility in terms of changing content and to facilitate a short turnaround times for print materials when they are needed.

In addition, many of the key elements in the EDA's marketing strategy will, in fact, play out at the local (rather than international or external) level. In pursuing a "narrow" segmentation marketing approach, one of the most compelling aspects of southeast Alberta's "value proposition" is the fact that a significant level of solar and green energy related activity is already taking place in the region. Mobilizing this existing presence as a testimony to the qualities of the community, while simultaneously developing local champions who may lead elements of the investment attraction process is an important element of the recommended approach. Similarly, engaging directly with firms and sector stakeholders in the community will allow economic development staff the opportunity to entice additional investment from investors and actors already connected to the community. As a result, key elements of the strategy must include:

- Creation of a Solar Sector Industrial Development Team – To directly engage local companies and stakeholders in the solar investment attraction process, and to generate additional resources and support for the EDA's sector efforts, the EDA should create a dedicated industry support group. This body would function as an industry advisory board, but also engage key stakeholders as a "rapid response team" to assist in meeting with and supporting potential investors considering solar-related investments in the community. This structure should also include representatives of other local economic development structures, who may be a source of valuable intelligence and – in the longer run – financial support and other resources.

Relationship building also plays an integral role in promoting and marketing to key markets. In the most recent edition of *Winning Strategies in Economic Development Marketing*, New York-based Development Councillors International suggests that more

than 50%of American executives claim to make business location decisions based on dialogue with industry peers, while another 28% noted that meetings with economic development groups are vital to their location decisions.

- Participation in Solar Industry Conferences and Trade Shows – the EDA should identify and attend a select number of key sector trade shows and events on an ongoing basis, and should consider hosting such events within the southeast Alberta region. Continued participation over time is a key element of this strategy, as knowledge, networks and effective engagement will take time to develop. For some trade shows and events – particularly larger ones where it is more difficult to establish a profile without a large budget – it may be valuable to engage external consulting or "match-making" assistance with lead generation or meeting arrangements to facilitate greater levels of contact with private sector delegates to these events. For some events, it may also be appropriate to partner with other communities and organizations, in order to make participation more affordable.
- External Corporate Calling based on Lead Generation – It is likely that some effort in follow-up corporate calling will be required as the marketing initiative unfolds, to advance to negotiations or discussions with potential investors identified through industry association and events. Existing print and web materials (described above) may be used in support of these efforts, but additional resources in terms of cost and staff time will also be required.

6.3 Building a Delivery Model

The delivery of programs and services related to the development of the southeast Alberta solar energy sector takes place in a complex environment. There are both local and regional economic development organizations and interests, private sector actors, public interest groups and not-for-profit organizations, post-secondary institutions and training providers, and local utilities. Each could accurately be said to have a legitimate and direct interest in the development of the solar sector ton the region, but none is likely – in the short term – to see significant advantage or opportunity to leading the development of the sector.

In this situation, the Economic Development Alliance of Southeast Alberta has an opportunity to be the structure that links these disparate interests together. Through the structure of a Southeast Alberta Solar Sector Industrial Development Team, as identified in section 6.2 above, the EDA would spearhead the creation of a specialized structure that unites all of the interested players and parties under a single umbrella. However, rather than acting as the "leader" of this structure, the EDA should position itself as a facilitator, acting as a staff or secretariat to support and implement plans and projects of the larger structure. Initially, the action plan contained in this report would guide the team's efforts, but as time passes, this direction will be updated and refined by the team itself.

From the outset, however, this team should be structured on a "pay to play" model, in which participants are asked to make a financial contribution to the group's overall

efforts. Initially, this contribution should be modest: perhaps $100 or $250 per year. This fee structure is recommended for several reasons:

- A financial contribution – however small – is likely to build an impression that team members are actually stakeholders and owners of the process, rather than simply advisors
- A financial contribution may deter less serious players from participating in the structure
- The aggregated financial contributions may amount to a few thousand dollars, and could be used to represent industry contributions in future funding proposals. This would provide opportunities to leverage the funds through various matching programs, thus increasing their overall impact
- The availability of "industry funding" has the potential to send a solid message about industry support to potential funders

Once established, this committee could play a number of key roles to both direct activities in the development of the solar sector, and to directly support these activities. Possibilities include:

- Developing and overseeing annual work plans to fulfill the action objectives outlined in this strategy, and to pursue other opportunities
- Increasing dialogue and interaction – and the opportunity for co-operative and joint ventures – between active players in the southeast Alberta solar sector
- Initiating "cluster development" efforts by exploring and promoting links between the solar sector and other industries already present in the community
- Acting as a "rapid response team" to provide support, information and competitive intelligence to potential investors who express interest in the region's solar potential
- Coordinating and fine-tuning marketing initiatives and communications efforts that support growth in the solar sector

In this latter role, the team may act as the first or key point of contact for companies, entrepreneurs and individual investors looking to visit the region, each member capable of providing direct and specialized knowledge that could benefit these outside interests.

From a governance perspective, there are a number of specific actions that should be taken to allow for the effective operation of this structure. These include:

- The Southeast Alberta Solar Sector Industrial Development Team (under this name or one preferred by its membership) should establish a non-profit corporation; the arm's length nature of this structure will enhance its standing in the private sector, and its ability to support future funding proposals as an industry association
- This corporation should elect a Board of Directors, including a President, Vice-President, Secretary and Treasurer (together comprising an Executive Committee); these positions should be rotated or opened to new participants on an annual basis

- The organization should meet at least quarterly, and the Executive Committee should meet more frequently
- The Economic Development Alliance of Southeast Alberta – while potentially sitting as a member of the organization - should provide staffing support on an ongoing basis
- Staffing support should include administrative support in terms of scheduling and organizing meetings, and providing minutes of those meetings, but should be principally focused on professional service support, perhaps through the dedication of a fixed portion of time of an EDA employee to work in the solar sector under the direction of the Team
- With the passage of time – and budget and levels of activity permitting – the Team may wish to increase the levels of financial participation by its members, and consider the additional of other staff and support roles

While it is clear that local and regional economic development structures could and should play a key role in this organizational structure, it would be desirable to have the structure's most visible roles filled by prominent actors from others organizations and institutions, such as electrical or other utilities, the college, or private companies.

7 Implementation Plan

Investment attraction or marketing strategies must build on the unique assets and resources of a community to form a framework for achieving economic and community prosperity. This framework must contain inspirational objectives, as well as a set of associated actions to be implemented in pursuit of the desired outcomes. The most successful strategies are community-based, with the ability to draw on the expertise and connections of other organizations to achieve the vision for development. For that reason, the implementation plan for the strategy must be generated from a detailed assessment of the local economic assets and connections, and the insights and consensus of the local community.

The Southeast Alberta Economic Development Alliance has the over-arching goal of becoming a centre of activity in the solar energy sector. The following section builds on the strategic directions of previous sections, and proposes an implementation plan for the EDA and community partners to build the profile and investment readiness of the region to accommodate increased investment in solar energy. The actions in the implementation plan are divided into three objective areas focused on building the resources and profile required of the southeast Alberta region to increase its competitiveness for solar energy investment:

1. Developing Administrative Capacity: Build and reorganize the internal and governance structures necessary to effectively manage the development and promotion of the solar energy sector in southeast Alberta.
2. Promoting Solar Energy Opportunities: Undertake detailed internally- and externally-focused marketing and communications activities to establish the region as a centre for solar energy development in Alberta and Canada.
3. Becoming Investment Ready: Create and undertake economic development activities and programs that minimize the barriers to solar energy investment, while offering a compelling argument towards making solar energy investments in southeast Alberta.

Each action has been outlined with an accompanying rationale in the sections below. Understanding that there are resource commitments that need to be made, and that there is a logical progression of activities needed to become a centre for solar energy, each action has been identified as high (1-3 years), medium (4-6 years), or low (7 years or more) priority for the southeast Alberta region. In an effort to ensure that the EDA can adequate measure progress towards the goal of solar energy investment attraction, a set of proposed performance measures are included for each action area.

7.1 Building Administrative Capacity

Action 1:Establish the Southeast Alberta Solar Sector Industrial Development Team, and provide ongoing staffing support to ensure its effective operation.		
Rationale and Key Elements	**Priority**	**Performance Measures**
Co-ordination of southeast Alberta's efforts to attract investment in the solar sector is a key to the successful implementation of this strategy, and will rely on the combined efforts of the economic development community in the region, as well other key stakeholders in the solar sector. By creating an industry-based body and supporting it through the work of exiting economic development staff, it will be possible to both enhance the external perception of industry support and involvement while providing dedicated strategic resources to the growth of the sector. Potential action elements: ■ Initiate discussions with regional partners regarding the establishment of the Southeast Alberta Solar Sector Industrial Development Team, ideally leading to the creation of an arm's-length structure ■ Create a fee-based membership regime in the new structure, and identify an Executive Committee to move the organization forward ■ Provide dedicated staff support to pursue the implementation of this strategy under the guidance of the new organization ■ Identify and pursue opportunities for additional external funding to support the continued growth of the sector	High	Number of active members Funds raised from industry partners Number of successful project funding applications Number of external investment visits/inquiries supported

7.2 Promoting Solar Energy Opportunities

Action 2: Develop and implement marketing programs and initiatives based on the directions and opportunities identified in this report.		
Rationale and Key Elements	**Priority**	**Performance Measures**
Successful attraction of investment in the solar energy sector will require a range of marketing approaches, material and messages to be developed in support of the Southeast Alberta Solar Sector Industrial Development Team's efforts. These marketing approaches will be both formal and informal, and will roll out in different ways at different stages of the implementation process. Potential high priority action elements: ■ The Southeast Alberta Solar Sector Industrial Development Team should develop its own sense of priority marketing approaches and messages, building upon the market research and segmented marketing approach recommended in this strategy ■ The Southeast Alberta Economic Development Alliance and other regional economic development partners should emphasize green and solar energy strategies as a part of their local communications efforts on an ongoing basis ■ A web-based "microsite" devoted to regional opportunities in the solar energy sector should be created and launched, and linked to a range of social media channels ■ Print marketing materials such as brochures and fact sheets should be developed utilizing content from the solar website, with the goal of creating "hard" materials that may be left with clients and potential investors in support of economic development activities Potential medium priority action elements: ■ EDA and other partners should co-ordinate efforts through the Southeast Alberta Solar Sector Industrial Development Team to enhance participation in industry conferences and trade shows ■ Sector partners should seek to develop key networks of informal industry contacts, sharing information and insights collectively, to leverage additional investment attraction information, support and leads ■ Working through the Southeast Alberta Solar Sector Industrial Development Team, the	High & Medium	Number of website hits/page views Circulation of print marketing materials Number of inquiries generated by marketing materials Number of industry conferences and trade shows attended Number of industry contacts in shared databases Number of corporate calls undertaken

EDA and its partners should undertake a sector-based corporate calling program outside of the region to proactively identify potential sector investors		

7.3 Becoming Investment Ready

Action 3: Encourage the development of pilot projects in the solar energy sector to demonstrate local capacity for development.		
Rationale and Key Elements	**Priority**	**Performance Measures**
A growing profile of projects in the solar energy sector has established a preliminary understanding of the solar energy opportunity in southeast Alberta. However, continued investment at the pilot project stage suggests a more stable commitment from the community, regional governments, and utilities towards the goal of solar energy sector development, but also functions as a means of examining which types of solar development are most productive and profitable. If new and innovative projects are undertaken by public bodies in the area, then private investors may be enticed to undertake similar projects once the cost-benefits are more clearly outlined. Potential action elements: ■ Connect with researchers and technology-transfer offices (where applicable) at post-secondary institutions in Calgary, Edmonton, Lethbridge, and Medicine Hat to understand emerging solar energy technologies, and opportunities near the pilot project stage where municipalities can offer support. ■ Produce a master list of prioritized pilot projects for EDA member municipalities to consider for implementation, accompanied by a guide outlining potential sources of funding. ■ Monitor the implementation of pilot projects in the region, and produce project-based statistics on potential costs-benefits of operation, with the intention of publishing those results to the public where possible. ■ Establish a list of solar energy sector companies and resources in the region, building on the value chain and pyramid of support exercise in chapter five. Connect interested private parties with companies and individuals that can assist with pilot project development.	High	Number of new Pilot projects per year Number of projects undertaken from master list per year

Action 4: Work with public utility partners to investigate the development and installation of innovative smart grid technologies in Southeast Alberta.		
Rationale and Key Elements	**Priority**	**Performance Measures**
The development of renewable energy systems in an area is in part dependant on the availability of infrastructure to support it. To support the need for more detailed information on demand in a timelier fashion, as well as assist with measuring the energy inputs from dispersed energy producers, communities are increasingly looking to the implementation of smart grid technologies. Smart grids represent the intersection of IT and communications infrastructure with utility infrastructure, in order to more accurately chart the production and consumption patterns of a utility system in real-time. From a renewable energy perspective, the implementation of smart grid technologies allow for the more accurate and timely measure of demand (which influences operation of reserve capacity generators), and the potential for the implementation of time-of-use pricing and more defined feed-in tariff policies. For an investor, the implementation of smart grid technologies signals a readiness of the area to accommodate renewable energy, but also openness to new innovations in the sector. Medicine Hat is currently in the process of implementing a pilot smart meter program , which will begin to replace existing water, gas, and electric meters in homes and businesses in a defined part of the utility's service area. The project will allow the utility to assess the costs and benefits of the smart meter program, and determine whether full-scale implementation will take place across the rest of the service area. Should the pilot program be successful, there may be additional smart grid innovations that could be considered throughout the service area, with an overall intent of identifying and implementing technologies that make it easier for renewable energy generators of all sizes to export energy to the utility system. Potential action elements: ▪ Monitor the implementation of the smart meter pilot program in the City of Medicine Hat, and work to assess the potential economic impacts that may be associated with full-scale implementation of the program. ▪ Identify best practices in smart grid project implementation from other jurisdictions (both urban and rural), with the intent of identifying 3-5 potential projects that could be undertaken in southeast Alberta. ▪ Work with the Medicine Hat Electric Utility to identify high-priority smart grid projects which could ease communications and technical access to the energy system for independent producers. Cross reference those technologies with companies that can construct and implement them, and open communications with those providers.	Medium	Full-scale implementation of smart meter program New smart grid projects undertaken in electricity service area per year. Annual investment in smart grid technologies (public and private)

Action 5: Undertake the review of existing, and development of new regional policies and programs to encourage private sector solar energy investment.		
Rationale and Key Elements	**Priority**	**Performance Measures**
The creation of policies and programs that support renewable and solar energy investment is a critical element to supporting the growth and prosperity of the solar industry, particularly in the early years of solar energy development and implementation. Over the shorter term, public policies and programs may be one of the only incentives to drive development from the private sector. Indeed, many of the earliest movers in the renewable energy sector across Canada have benefitted from aggressive public policies and programs that have acted as incentives to private sector investors. The most notable is perhaps Ontario's *Green Energy Act*, which contained provisions to implement a feed-in tariff program and streamlined development review process, while stimulating renewable energy equipment production and manufacturing in the province. There is an opportunity for Southeast Alberta to ensure that existing policies (primarily land use and building) and programs at regional organizations and institutions are aligned with the goal of large- or small-scale solar energy development. Further, there is an opportunity to develop new policies and programs that could be considered incentives for the solar energy industry, such as consideration of a competitive feed-in tariff or other compensation/subsidy program for energy producers. Potential action elements: ▪ Undertake a review of planning and building regulations across the region to identify any barriers with regards to the construction and operation of small- to large-scale solar installations in southeast Alberta. Assist with the development of alternative policy proposals for consideration by planning and building authorities. ▪ Establish a partnership with Medicine Hat College's program development office to investigate new areas of programming for the college. Assist the college in building relationships with potential industry and institutional partners. ▪ Undertake an annual best practices review of feed-in tariff policies, rebate programs, and other financial incentives to encourage solar energy investment, with the intent of developing a prioritized "wish list" of policies and programs for the consideration of Medicine Hat Electric Utility and EDA municipal partners for programs like Hat Smart (where resources permit). ▪ Advocate for new renewable energy policies and programs at the provincial level.	Medium	New solar energy or renewable energy programs available in the region. Yearly enrolment in solar or renewable energy programs in the region. Funding secured for public and private sector projects from higher levels of government.

Action 6: Establish Southeast Alberta as a hub for solar energy industry expertise, experience, and practical research, connected to a web of resources across Canada and the world.		
Rationale and Key Elements	**Priority**	**Performance Measures**
With the potential success of the strategy over the longer term, the southeast Alberta region has the potential to become the centre for solar energy development in Alberta, and perhaps a major centre across all of Canada. Beyond building industry and institutional capacity, the southeast Alberta region much position itself as that hub for the province – becoming a type of clearing house for expertise and technology developed across the province and country, but also from strategic partners across the globe. In order to become a hub, the southeast Alberta area should focus on building up regional strengths in the industry, but also connecting with strategic partners across Canada and the world. There are elements of the existing energy value chain which will benefit the solar energy industry, as outlined in section five of the report. These companies and organizations encompass the skills and expertise that is required to design, construct, and operate energy systems; skills and capabilities which are transferable to the solar energy industry. As such, they should be priority targets for investment attraction and business retention/expansion activities in the area. This will build the local industry cluster, and maintain and establish expertise in the sector. Further, there are elements of the industry in which it makes more sense for southeast Alberta to find a strategic partner to assist with development. For example, though the region has strong practical and technical education programs, the high-technology research and discovery activities will likely remain anchored to major research universities. As such, southeast Alberta will benefit from connecting with partners that have the capacity to disseminate solar energy research and experience with the region. The southeast Alberta region benefits from almost unparalleled solar energy potential, which makes it a logical testing ground for new technologies developed across the world. Overall, southeast Alberta should look to develop regional capacities into a hub for the industry, but also look to connect with other industry hubs across Canada and the world for expertise and research relevant to southeast Alberta. Potential action areas: ■ Focus business retention and expansion programs, and investment attraction programs, on businesses and organizations that fall within the solar energy pyramid of support, as outlined in section five. ■ Identify potential institutional connections from across Canada and the world, and establish connections with institutions/researchers working on technologies	Low	New pilot projects from external investors per year New jobs in solar energy industry sector per year Meetings with domestic and international partners in the solar energy industry per year

relevant to southeast Alberta ▪ Identify a list of relevant organizational and institutional partners in Alberta, and maintain communications with those potential partners. ▪ Promote southeast Alberta as a centre of practical research and pilot projects.		